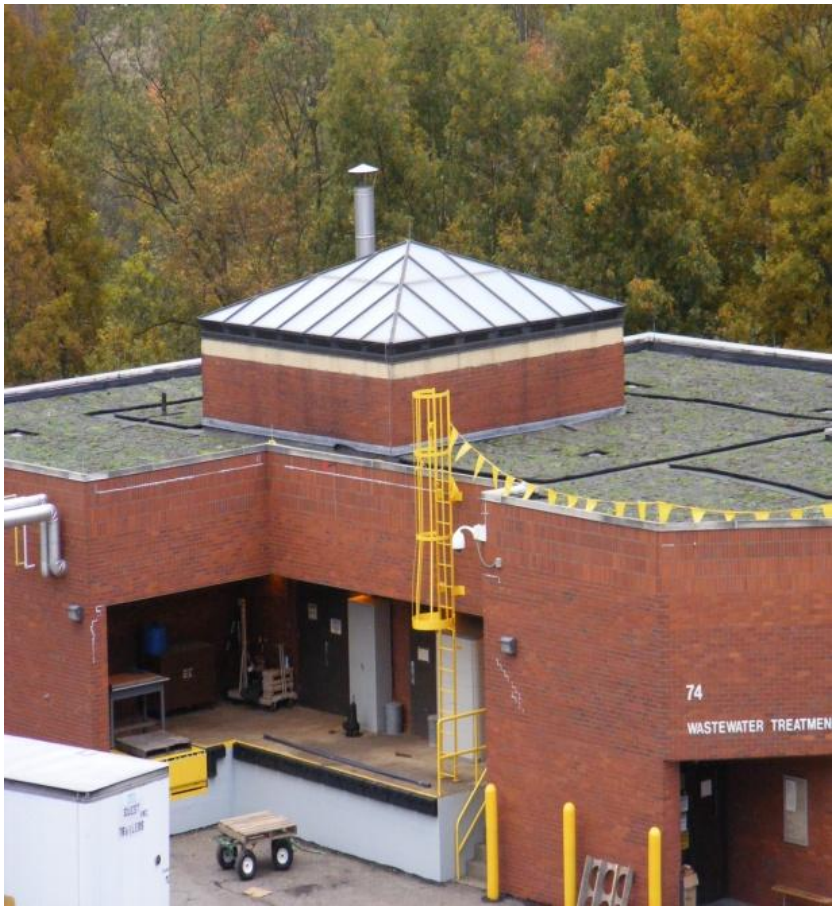
NATIONAL ENERGY TECHNOLOGY LABORATORY



2009 Annual Site Environmental Report

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2009 Annual Site Environmental Report

September 28, 2010

U.S. Department of Energy
National Energy Technology Laboratory
Albany, Oregon
Fairbanks, Alaska
Houston, Texas
Morgantown, West Virginia
Pittsburgh, Pennsylvania

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Table of Contents

2009 NETL ANNUAL SITE ENVIRONMENTAL REPORT

EXECUTIVE SUMMARY

The National Energy Technology Laboratory (NETL) continued its exceptional success in its ES&H programs throughout 2009. Most notably, substantial progress was made to ensure that the Albany site is fully integrated with NETL's environmental strategy. This is demonstrated by the fact that the Albany, Morgantown, and Pittsburgh operations all maintained ISO 14001 certification. Additionally, the Albany operation was recertified during 2009.

With its environmental management framework in place, NETL takes a tandem approach to planning and managing its activities in an effort to minimize its environmental impacts. Some activities require continuous management and monitoring for the foreseeable future, while other activities can be completed in a single effort. Those activities requiring continuous management are monitored through ES&H. Those specific activities that require a concentrated effort are managed using environmental management plans (EMPs).

The permit limits for the Industrial Sewer User Permit at Pittsburgh issued by the Pleasant Hills Authority (PHA) were exceeded for chloroform in February 2009 and a Notice of Violation (NOV) was received although the level of chloroform was higher in the background drinking water samples than in the effluent sample. The comprehensive and thorough approach to environmental compliance implemented at NETL uncovered no issues of noncompliance, and NETL was in full compliance with all applicable environmental Executive Orders (EO). Throughout the year, numerous inspections and audits were performed and documented to ensure no instances of environmental noncompliance. EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, was issued on January 26, 2007, and presented several new challenges. The Order instructs Federal agencies to conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically, and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. Through multistate, sitewide coordination and integration, NETL was able to achieve substantial progress in implementing the requirements of this new Order.

To effectively implement EO 13423, NETL uses an Environmental Management System/Safety Management System (EMS/SMS). A Management Review Team (MRT) is in place to ensure that NETL's Environmental, Safety, and Health (ES&H) policy and system remain appropriate and effective. The EMS/SMS representative conducts semiannual review meetings with the MRT to consider the policy, objectives, targets, internal and external audits, and other related issues. Changes are documented and implemented. Management involvement ensures that the projects are funded and the appropriate priority is established. For example, the MRT

encouraged upgrading or replacing the Assessment Information Input System (AIIS) and the Albany Trackwise® system, corrective action tracking systems currently used in Morgantown and Pittsburgh (AIIS) and in Albany (Trackwise), respectively.

NETL is working to develop a new, consolidated, corrective action tracking system to replace the two existing systems. The new system will be used by all of NETL and is expected to incorporate a host of improvements based on user feedback. Several commercial and in-house systems have been reviewed, and a new system will hopefully be available for testing sometime in 2010.

In addition to on-site laboratory efforts, NETL also manages off -site environmental projects as well. There were three ongoing compliance activities in the State of Wyoming during 2009. Two sites required ongoing active remediation activities, and one site has been cleaned up and is subject only to vegetation surveillance monitoring. The other two are active sites in which the groundwater is contaminated with volatile organic contaminants (VOC) and semi-volatile organic contaminants (SVOC). Organic contaminants of concern are primarily benzene, toluene, ethyl benzene, and isomeric xylene (BTEX) compounds. Underground coal gasification and oil shale retorting tests resulted in ground water contamination at the two active sites.

While NETL does not generate, process, or treat any radioactive material, it houses any temporary or permanent facilities for radioactive waste disposal. Except for some naturally occurring radioactive materials (NORM) at the Albany site, all radioactive materials at NETL are limited to research instrumentation that contains sealed radioactive sources and radiation-generating devices. An inventory of radiation sources is actively maintained and monitored by the radiation safety officers for each site. Information is retained about the source, isotope, quantity, custodian, location, status, and sealed-source activity. Title 10 CFR 835.901(e), DOE Policy 441.1, and NETL Procedure 440.1-17 are the applicable regulations and requirements. In addition, NETL implements several best management practices that include following DOE implementation guides, Environmental Protection Agency (EPA) information, Nuclear Regulatory Commission (NRC) information, and Commonwealth of Pennsylvania recommendations and requirements. All of the radioactive sources are sealed and used in instrumentation.

NETL received a National Partnership for Environmental Priorities Program (NPEP) Recognition Award for 2009. The NPEP is a waste minimization program run by the EPA. This voluntary program encourages results by publicly recognizing and showcasing the source reduction, recycling, and advanced manufacturing accomplishments of Member Partners who commit to reducing wastes containing the Waste Minimization Priority Chemicals. NETL recently reduced its inventory of mercury by 140 pounds and was recognized by the EPA for its efforts. The mercury was sent offsite to be recycled. This goal was achieved by replacing mercury-containing equipment with environmentally safe substitutes and disposing of stored equipment that contained mercury. And, for the third year in a row, NETL has been

identified as an EnviroStar award winner by the Allegheny County Health Department (ACHD), located in Pennsylvania. NETL was one of six organizations in the Pittsburgh area to receive the award, but the only organization to receive a three-star rating. The rating was based on NETL's efforts under its environmental management system, including energy savings (energy saving light fixtures), mercury reduction, in-house recycling, participation in the Federal Electronics Challenge, use of low or no VOC paints, among other accomplishments.

Details on each of the above-mentioned subjects, as well as information on other NETL ES&H programs are presented in this report. The report should answer questions the public may have about NETL's activities to protect the environment. However, questions and comments are always welcome and should be addressed in writing to: Dr. Robert Reuther, U. S. Department of Energy – NETL, M/S N03, 3610 Collins Ferry Road, P. O. Box 880, Morgantown, WV, 26507-0880; or by e-mail to Robert.Reuther@NETL.DOE.GOV.

INTRODUCTION

2.1 General Information

NETL is part of the Department of Energy's (DOE) national laboratory system. It is the Department's only national laboratory devoted to fossil energy research. NETL supports the DOE mission to advance the national, economic, and energy security of the United States.

NETL has expertise in coal, natural gas, and oil technology research, contracting and project management of fossil energy research, systems analysis of energy conversion technologies, and energy supply and production issues from both a national and international perspective. In addition to research conducted onsite, the NETL project portfolio includes research and development (R&D) conducted through partnerships, CRADAs (cooperative research and development agreements), financial assistance agreements, and contractual agreements with universities and the private sector. Together, these efforts focus a wealth of scientific and engineering talent on creating commercially viable solutions to energy and environmental problems.

NETL has sites in Albany, Oregon; Fairbanks, Alaska; Houston, Texas, Morgantown, West Virginia; and Pittsburgh, Pennsylvania. In total, these sites include 81 buildings and 14 major research facilities covering nearly 200 acres. More than 1,100 employees work at NETL's five sites; roughly half are federal employees and half are site-support contractors.

NETL is organized into seven strategic units:

The **Strategic Center for Natural Gas and Oil** (SCNGO) integrates all elements of DOE's natural gas and oil research. SCNGO is charged with implementing science

and technology development to resolve the environmental, supply, and reliability constraints of producing and using oil and gas resources – resources that account for more than 60 percent of the energy consumed in the United States. With core competencies and expertise in all aspects of natural gas and oil, SCNGO investigates and manages R&D leading to improved natural gas and oil production and use. SCNGO invests in projects that promise tangible benefits, including a cleaner environment and increased domestic natural gas and oil production.

The **Strategic Center for Coal** (SCC) works to ensure national energy security and economic prosperity through the production of clean, affordable electricity and fuels, including hydrogen, from coal, the nation's most abundant energy resource. The SCC is charged with implementing research, development, and demonstration activities to resolve the environmental, supply, and reliability constraints of producing and using coal resources. Environmentally responsible coal production technologies will allow the United States to continue to meet growing electricity demands and to lay the foundation for a sustainable hydrogen economy.

The **Office of Systems, Analyses and Planning** (OSAP) studies large, complex systems, such as industrial or ecological processes, and the interactions among those systems, including the social, economic, political, regulatory, technological, design, and management properties, each of which are systems in their own right. The complex nature of these systems requires an interdisciplinary approach. System studies provide input to decisions on issues such as national energy plans and programs, resource use, environmental and energy security policies, R&D directions, and deployment of energy technologies. System studies are also used to support planning exercises at various organizational levels. Systems analysis focuses on production and processing of fossil fuels and energy and fuel systems synthesis and design. Benefits analysis performs prospective and retrospective analysis of benefits stemming from program investments in fossil fuel-based technologies. Situational analysis collects data and assesses current and long-term trends within the energy industry that may impact energy production and use.

The **Project Management Center** (PMC) harnesses expertise and talent for non-fossil energy research, development, and demonstration projects, including those with other federal organizations, such as DOE's Office of Electricity Deliverability and Energy Reliability, DOE's Office of Energy Efficiency and Renewable Energy, and the Department of Homeland Security. PMC performs overall management and implementation of these customers' advanced initiatives, providing technical expertise, analytical tools, and a full suite of implementation skills.

The **Office of Research and Development** (ORD) performs basic and applied R&D in fossil energy and environmental science. Building on historic laboratory strengths and competencies, ORD concentrates on four primary research topics, or focus areas:

- The Energy System Dynamics Focus Area develops natural gas technologies with higher efficiencies and lower costs, such as advanced gas turbines and fuel cells.

- The Geological and Environmental Systems Focus Area concentrates on the minimization and abatement of environmental problems associated with the use of fossil fuels. Research topics include geological sequestration of carbon dioxide, oil and gas exploration and production, air pollution/particulate matter issues, and removal of toxins from the emissions in coal utilization systems.

- The Computational and Basic Science Focus Area develops tools that enable more rapid and efficient scale-up of new subsystems, devices, and components to commercial scale.

- The Materials Science Focus Area specializes in the life-cycle research of metals, alloys, and ceramics and in the recycling and remediation of waste streams associated with these processes.

The **Office of Institutional & Business Operations** (OIBO) plans, directs, and coordinates administrative, operational, construction, and support activities for the Laboratory, including organization and human resource management; the Laboratory's Chief Financial Officer (CFO) function; budgetary and financial analyses and administration; information technology management, maintenance and implementation; on-site ES&H program execution, compliance, and remediation activities; acquisition and assistance services; site management including design, construction, operation, and maintenance of NETL facilities; and real and personal property management.

The **Office of Crosscutting Functions** (OCF) plans, directs, and coordinates policy, administrative, and site support contract management activities that crosscut Laboratory activities. The Office manages the NETL performance measurement system, conducts compliance reviews, and manages site support contracts.
OCF Strategic Drivers

- Provide a creditable and efficient contractor work force that is temporary, flexible, and designed to enhance NETL's national laboratory status.

- Obtain best performance from the contractors who support NETL to achieve its strategic goals and fulfill its mission.

- Design and implement annual performance measurement systems to enhance NETL's status as a national laboratory.

2.2 Focused Standards List

NETL is committed to ensuring compliance with all of the environmental requirements impacting the Albany, Fairbanks, Morgantown, Pittsburgh, and Tulsa sites. Compliance with the numerous requirements found in departmental directives; EOs; federal, state and local codes; federal, state, and local regulations; acquisition letters; negotiated agreements; and consensus standards is extremely challenging. To ensure compliance requirements are met, NETL established a list of requirements specific to NETL operations. This list, NETL's *Focused Standards List*, embodies all of the requirements that apply to NETL operations.

The Focused Standards List was created by NETL ES&H subject matter experts. These ES&H subject matter experts oversee approximately 75 specific ES&H Programs coordinated by the ESS&H Division. Standards and requirements determined by the subject matter experts to be applicable to the NETL ES&H activities are incorporated into one or more NETL directives. These directives provide the policy, programs, and procedures used to implement those standards and requirements. There are 127 directives, consisting of 10 orders, 16 operating plans, and 101 procedures. Each directive contains a set of requirements. All standards or requirements on the Focused Standards List are implemented through one or more of the NETL directives.

The Focused Standards List includes both the standard or requirement citation and the location where the standard or requirement may be found. On a quarterly basis, the location that is published for the standard or requirement is checked to ensure that it is still available at that location. Most of the requirements identified in the Focused Standards List are accessible via the Internet. The quarterly location check verifies that the Internet link is still active. Most of the standards are copyrighted. The standards are purchased, and one copy is placed in both the Morgantown and Pittsburgh libraries. On an annual basis, the Focused Standards List is analyzed to ensure that the standards and requirements listed are still applicable to NETL activities. In addition, approximately every three years the subject matter expert for an NETL ES&H directive reviews the directive and develops an update if appropriate.

Verification that the standards and requirements listed on the Focused Standards List are being implemented occurs through the following approach:

- First, NETL utilizes a rigorous Safety Analysis and Review System (SARS) to review the details of a project before authorizing any significant activities to proceed. Checklists have been developed for the SARS to facilitate verification of the standards and requirements to be covered during the review. Also, ES&H subject matter experts provide support to the SARS process and ensure that applicable ES&H standards and requirements are addressed.

- Second, NETL has retained the services of an independent third party auditor to perform comprehensive compliance assessments of specific ES&H programs. This auditor performed three such assessments in 2009: the Emergency Eyewash and Shower Equipment Program, Work Permits and Special Work Program, and Spill Prevention and Control Management.

- Third, NETL performs regular walkthrough inspections of site facilities, targeting specific facilities each month so that all NETL facilities are inspected each year. These walkthrough inspections are performed by several ES&H subject matter experts who visually verify that NETL is in compliance with all of the standards and requirements.

- Finally, the preparation of this Annual Site Environmental Report requires a complete review of compliance with all of the major standards and requirements. More than 60 subject matter experts participate in this effort to review the past year's performance in complying with the ES&H standards and requirements on the Focused Standards List.

2.3 Discussion of Sites Within the Document

Three research sites and two field offices comprise NETL. Each office is located in a different state, is subject to different state and local laws, and focuses on different activities. Because most members of the public are interested in learning about only one site (the site located nearest them), this document splits the detailed discussion among the sites. The Albany, Morgantown, and Pittsburgh sites are laboratories that have a broad array of environmental concerns, so a detailed discussion is provided for each in this report. Houston and the Alaska field offices perform only administrative functions, and, as a result, there is less discussion of their environmental impacts and any regulatory compliance issues.

2.4 Accomplishments

NETL's efforts are focused on resolving the environmental, supply, and reliability constraints of producing and using America's fossil fuel resources. To accomplish this mission, NETL draws on approximately 1,100 federal and support-contractor employees to implement and manage a broad spectrum of research programs. The laboratory has five sites that span the United States. NETL sites in Pittsburgh, Pennsylvania, and Morgantown, West Virginia, conduct a broad range of research to increase the supply of traditional energy resources, improve the efficiency and environmental performance of power generation plants, and help end users conserve energy. Researchers at NETL's site in Albany, Oregon, focus on developing advanced materials for use in the energy industry. Sites in Houston, Texas, and Fairbanks, Alaska, address challenges unique to those energy-rich regions. All five locations share the same goal: to advance science and technology for a clean, secure energy future.

One measure of NETL's success is the five R&D 100 Awards that NETL and NETL-supported technologies earned in 2009. These prestigious awards, which the Chicago Tribune dubbed "the Oscars of Invention," are given annually to the 100 most technologically significant new products to hit the market in a given year. According to *R&D Magazine*, which selects the winning technologies, the goal of the award is "to spotlight major breakthroughs – products and processes with the capacity to improve the standard of living for many people."

The first award recognized NETL's Virtual Engineering Process Simulation Interface (VE-PSI), which was developed in collaboration with Ames National Laboratory (ANL) and Reaction Engineering International (Salt Lake City, Utah). The VE-PSA software gives engineers the ability to create virtual prototypes of new plant designs and to improve existing designs more quickly and efficiently. The second award recognized the Clay-Liquid CO_2 -Removal Sorbent. This sorbent, developed in cooperation with Sud-Chemie (Louisville, Kentucky), removes CO_2 and other gases from coal combustion exhausts at temperatures ranging from ambient to 60 degrees C. The third award recognized the Thief Mercury-Removal Process, which was licensed to Nalco-Mobotec for commercial development. The Thief Process extracts sorbent in the form of partially combusted coal from the furnace of a coal-fired power boiler for re-injection downstream into flue gas ductwork. The fourth award recognized SEQUIRE ™ Tracer Technology. This innovation uses perfluorocarbon tracers to tag CO_2 stored in geologic formations, differentiating it from natural CO_2 fluxes. Finally, the fifth award recognized the Super Hard and Slick (SSC) material development. A super hard and slick coating jointly developed by a team from ANL and Istanbul Technical University captured one of *R&D Magazine's* prestigious awards in the Thin Film category. This computer-designed metallic composition reduced friction in test engines by 80 percent when compared to uncoated steel and virtually eliminated wear under severe boundary-lubricated sliding regimes.

The Federal Laboratory Consortium selected two flue gas cleaning processes invented by NETL for 2009 Awards of Excellence in Technology Transfer. The first is the NETL-patented Thief Process. Tests up to and including pilot-scale have shown that Thief sorbent capacities for mercury are comparable to those of commercially available activated carbons, but, because they are cheaper, the novel sorbents promise to reduce significantly the cost of mercury removal from flue gas. The second award went to a wet scrubbing process that uses an ammonia-based solution to remove SO_2, NO_x, and CO_2 from flue gas. Licensed to Powerspan Corp., the process produces a salable commodity in the form of ammonium sulfate or nitrate fertilizer, and, relative to capturing the greenhouse gas CO_2, the ammonia solution can be regenerated and recycled to minimize cost.

Some singular accomplishments performed in 2009 are described below:

- As part of an overall effort to compare the economics of fuel cell-based systems in central station and distributed generation applications, an NETL team analyzed the projected cost of electricity produced by two integrated coal

gasification-fuel cell (IGFC) power plants that use planar solid oxide fuel cell (SOFC) technology to convert synthesis gas (syngas) to electricity. Results show that while the fuel cell system is more expensive than a conventional combustion turbine, that expense is counterbalanced by the decrease in the unit cost of upstream equipment due to the high IGFC system efficiency. In addition, the fuel cell platform offers the opportunity for nearly 100 percent CO_2 capture.

- NETL's Office of Systems, Analyses, and Planning (OSAP) has a mission: guide R&D toward balanced energy solutions in areas such as economic sustainability, supply security, and mitigation of global climate change. With this in mind, OSAP took a careful look at firing biomass along with coal (called co-firing) in integrated gasification combined cycle (IGCC) power plants to see how this approach could play a part in low-carbon power generation. OSAP's findings show that adding biomass generally decreases plant efficiency. However, when used as a greenhouse gas (GHG) mitigation strategy, biomass reduces the need to use conventional CO_2 capture and compression, both of which require substantial auxiliary loads. As a result, when targeting a certain GHG emission level, plan efficiency actually increases as the proportion of biomass increases.

- Working through the West Virginia Hydrogen Working Group, NETL funded and coordinated the construction of West Virginia's first hydrogen fueling station as part of a planned "hydrogen corridor" that will eventually refuel hydrogen-powered vehicles from Charleston, West Virginia, to Morgantown, West Virginia. The new facility is designed to fuel vehicles and other equipment while serving as a place for hydrogen research, development, and evaluation. It was dedicated at a ribbon-cutting ceremony on August 17, 2009, as part of the 5th Annual Hydrogen Implementation Conference organized by the Mountain States Hydrogen Business Council.

- NETL researchers designed a skid-mounted array of 12 solid oxide fuel cells (SOFCs) which completed continuous testing during gasifier operation at DOE's National Carbon Capture Center in Wilsonville, Alabama. The results will be used to design a cleanup system for SOFCs operating on coal-derived synthesis gas (syngas). Using syngas for powering fuel cells can help secure our energy independence by extending the useful lifetime of our most abundant energy resource, coal.

- NETL scientists demonstrated reduced NO_x emissions from a high-hydrogen diffusion flame gas turbine combustor by diluting the fuel stream with nitrogen rather than air, as currently practiced industrially. Results obtained in NETL's Fundamental Combustion Laboratory show that for all lean-diffusion-flame combustor types, including swirl-stabilized combustors, flame temperatures are always minimized by diluting the fuel stream, leading to lower NO_x emissions. For non-swirl combustor types, such as lean direct injection combustors, fuel-

side dilution (versus airside dilution) reduces NO_x formation times, which also has important implications for the design of high-hydrogen combustors.

- In May 2009, the first National Carbon Capture Center (NCCC) opened its doors. NETL, along with Southern Company Service, Inc., and other industrial participants have established the NCCC to further national efforts in reducing greenhouse gas emissions, such as CO_2, that are thought to contribute to global climate change.

- NETL analysts have identified technological approaches that could close the gap between today's electricity grid conditions in West Virginia – a state with grid reliability well below the national average – and those likely to be required for a 21st-century economy. If implemented in a coordinated effort rather than independently, the 20-year cost (less than $10 billion) of the recommended solutions would provide more than $12 billion in benefits to consumers, utilities, and society. Details of the plan can be accessed from the Energy Analysis Reference Shelf at the NETL website.

This is only a sampling of the accomplishments made by NETL in 2009. For a more complete description of NETL's accomplishments, please see NETL 2009 Accomplishments located on the NETL internet website.

ENVIRONMENTAL, SAFETY, AND HEALTH MANAGEMENT SYSTEM

3.1 Introduction to the NETL Environmental, Safety, and Health Management System

The Pittsburgh and Morgantown sites received certification to the ISO 14001 standard, EMS, on August 31, 2003, and the Albany site received certification to ISO 14001 on June 9, 2005. All three sites have maintained those certifications through 2009, following surveillance and recertification audits. The Tulsa and Fairbanks sites are not required to have an Environmental, Safety, and Health Management System (ES&HMS) because these operations are not considered facilities as defined by EO 13148; their activities are limited to desktop operations that do not impact environmental programs.

The Morgantown and Pittsburgh sites were recertified as a single entity in 2007 by Orion Registrar, Inc. Two ISO14001/OHSAS 18001 surveillance audits were conducted in 2009, the first on March 4-5, 2009, and the second on October 28-29, 2009. In addition, Albany was also recertified by Orion Registrar, Inc., during an audit that took place on November 23-24, 2009. In order to maintain certification, surveillance audits are conducted every six months at the Morgantown and Pittsburgh locations, and every 12 months at the Albany location. The audits in Morgantown and Pittsburgh measure continual improvement to the ES&HMS and conformance to the ISO 14001 and OHSAS 18001 standards. The audits in Albany also measure

continual improvement to the ES&HMS, conformance to the ISO 14001 standard, and conformance to the ISO 9001 standard. By maintaining these certifications, NETL demonstrates to its workforce, the surrounding community, DOE, and other stakeholders that it is committed to responsible environmental stewardship.

NETL's ES&HMS at the Morgantown and Pittsburgh sites assures consideration of environmental, safety, and health impacts of day-to-day activities and minimizes these impacts, as much as possible, consistent with the mission of fossil energy R&D. The ES&HMS, as described in NETL Order 450.1, Environmental, Safety and Health Management System, includes a policy statement, top-down responsibility, personal accountability for work being performed, regulatory awareness, document control, goals, self assessments, and continual improvement activities.

The scope of the ES&HMS for the three sites covers on-site operations involving employees at the Albany, Morgantown, and Pittsburgh sites, including on-site R&D activities, site operations, and the supporting administrative functions related to these activities and operations. Operations not owned or controlled by NETL are excluded from the ES&HMS, such as the credit unions, childcare facilities, and the small Navy facility at Morgantown.

The underlying framework of the ES&HMS is DOE's Integrated Safety Management (ISM) system, whereby ES&H accountability is integrated into individual decisions and corporate planning processes. ISM/ISO/OHSAS all provide for a plan-do-check-act approach to maximizing the protection of the public, NETL employees, the environment, and property. The ES&HMS uses the same philosophy to protect the environment, both onsite and offsite, during the conduct of operations under NETL's control.

3.2 Environmental, Safety, and Health Policy

NETL senior management created an ES&H policy which is the basis for NETL's ES&H program. NETL strives to reduce injuries to the workforce and to minimize hazards to the public and the environment. NETL requires consideration of potential environmental, safety, and health impacts when planning and executing work at all levels. The original policy was updated and approved by senior management in 2005 to align with the 2004 version of the ISO 14001 standard. It was updated again in 2006 to include the Albany site and to incorporate safety and health concerns. The policy was last modified August 9, 2006.

Management commitment and employee involvement are required to maximize oversight and improve communications. However, responsibility for effective environmental performance rests with line management. Line management must involve workers in the planning and execution of environmental programs and must fully communicate information to workers and others.

NETL uses the acronym PRISM to illustrate its policy (see Figure A). PRISM demonstrates the successful incorporation of ISM into the EMS. The PRISM graphic is displayed widely at the sites and is provided to each employee in badge form, as a reminder of the policy. The PRISM logo was updated in 2006 to include safety and health, as well as to support the OHSAS 18001 certification.

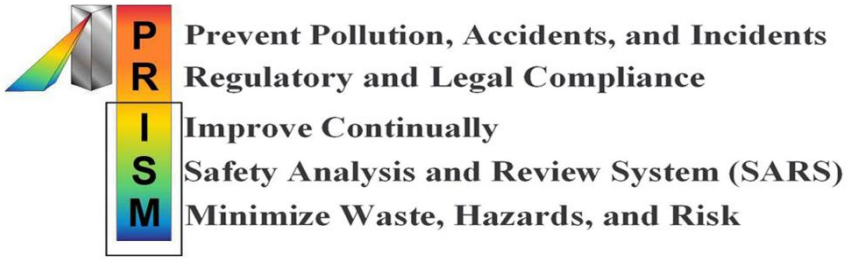


Figure A: Illustration of NETL Environmental Policy

3.3 Identification of Environmental Aspects

Environmental, safety, and health aspects are elements of an organization's activities that can interact with the environment, and are those under NETL control or influence. All research projects, operations, and facilities have been inventoried and scored based on their potential for impacting the environment, natural resources, and environmental laws and regulations. The scores are reviewed by the ES&HMS Crosscutting Team, a group of ES&H professionals and administrators consisting of both DOE and contractor staff and are used to determine the most significant aspects of NETL activities. The team recommends to the ES&HMS representative those aspects considered significant. The ES&HMS representative approves the list of significant environmental aspects.

The 2009 registry (see Table 3.3.1) provides a listing of the significant environmental aspects. No new aspects were added for the Morgantown and Pittsburgh sites in calendar year 2009, however, the Albany site was included within the scope of the ES&HMS, and as a result, two new objectives and their respective targets were added to address specific issues at the Albany site: Life Safety Code Issues and Groundwater Quality. Also, at the Management Review Team meeting held in July 2009, the MRT decided to begin tracking its objectives and targets on a fiscal year basis in FY2010 to coincide with external reporting requirements. In addition, there was concern that NETL's ES&HMS would need to accurately address the requirements of E.O. 13423, and as a result the number and level of detail of NETL's objectives and targets were expanded, see Table 3.4.1.

3.4 Environmental Objectives and Targets

Following an annual update and ranking of the significant environmental aspects, NETL's environmental objectives and targets are revised and presented to the Management Review Team for approval.

Environmental objectives are goals that an organization attempts to achieve. Environmental targets are specific measurable or quantifiable criteria which support those objectives. Performance measures are compared to targets to determine the degree of success in reaching associated objectives. Before establishing and reviewing its objectives, NETL considers regulatory and DOE requirements; technological options; financial, operational, and business requirements; and the views of interested parties.

The ES&HMS representative, with input from the Management Review Team, assigns responsibility for the objectives and targets to individuals with expertise in the respective subject areas. These individuals develop ES&H management plans (EMPs) that specify how NETL will meet its objectives. As with the aspects, the objectives and targets for 2009 include safety and health objectives and targets as well. The approved objectives and targets, and the actual performance data for the 2009 aspects are presented in Table 3.4.1 for Albany, Morgantown, and Pittsburgh.

3.5 Environmental, Safety, and Health Planning and Analysis Procedures

NETL takes a tandem approach to planning and managing its activities in an effort to minimize environmental, safety, and health impacts. Some activities require continuous control for the foreseeable future, while others can be completed in a single effort. Those activities requiring continuous control are managed through ES&H programs. Activities that represent a concentrated effort are managed through EMPs as described in section 3.4.

ES&H Directives. Most activities that can impact the environment are routine and occur repeatedly during ongoing operations. Because these activities are not one-time events, they are best managed through programs that are documented in directives (orders, operating plans, and procedures). These directives are written to describe how routine actions are undertaken to achieve the safety and environmental goals of NETL. Managerial responsibilities are attached to EMS/ES&H function titles. NETL directives establish the foundation and control mechanisms of the ES&HMS. The directives process is described in NETL Procedure 251.1-1, Directives Management System.

EMPs. Some activities that impact the environment can be addressed through a concentrated plan. The specifics of the process and elements of an EMP are explained in NETL Procedure 450.4-19 ES&H Significant Aspects, Objectives, and Targets. Each EMP specifies the nature of the action to be taken, the timeframe for the action, the responsible person(s) for the action, quantifiable targets, and measured performance against the targets. Quarterly status reports are collected for each of the EMPs to demonstrate progress.

3.6 Implementation and Operational Controls

The ES&HMS is implemented through an organizational structure shown in Figure B. Senior level positions include: the director, who serves as the ultimate authority for the ES&HMS; the chief operating officer, who has authority for all on-site operations, including in-house R&D and administrative support and crosscutting functions, and is a lead member on the Management Review Team; the director of the Office of Institutional and Business Operations, who is the environmental steward and champion; and the division director for ESS&H, who functions as the program administrator; the director of the Site Operations; the director for Engineering Research; and deputy director for ESS&H, who serves as the EMS representative. Mid-level titles and responsibilities are defined in several NETL directives that specify key components of the ES&HMS. The ESS&H division director assigns employees to the function titles and responsibilities.

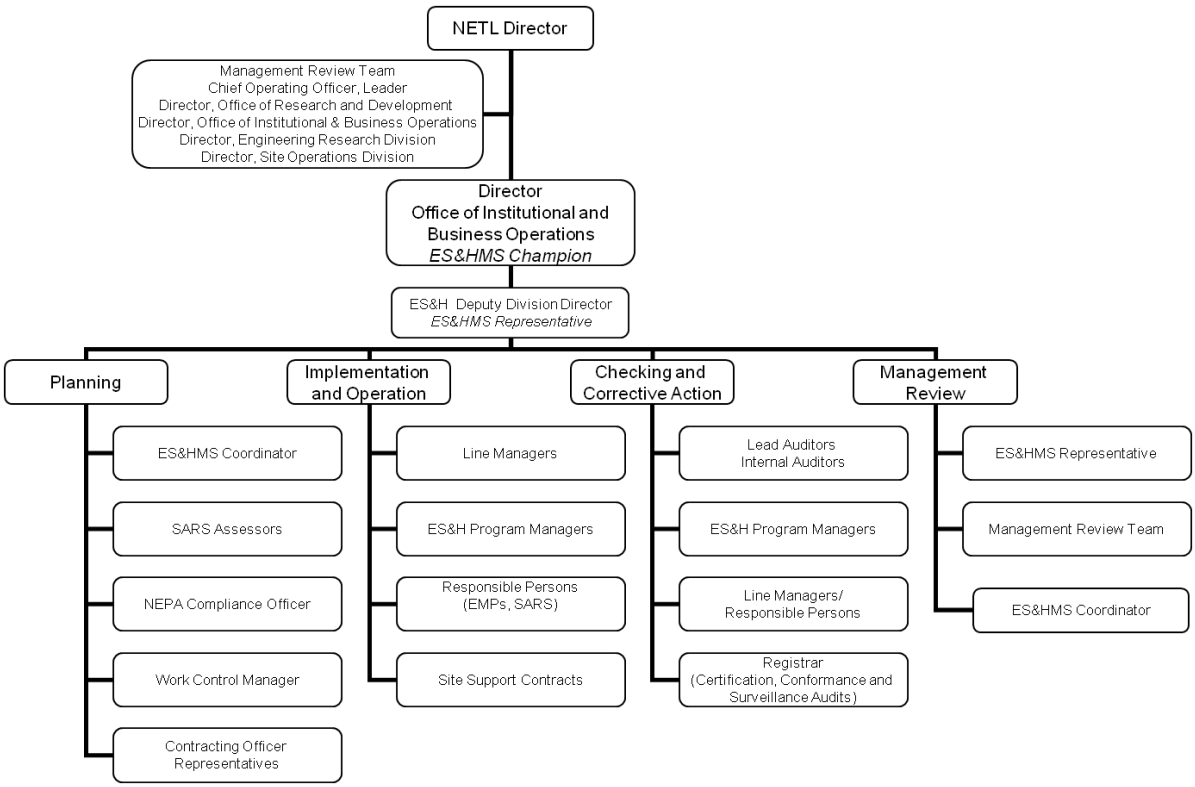


Figure B: NETL ES&HMS Organization

Extensive internal communication is necessary to successfully implement any program. The NETL system of line management responsibility requires that line managers communicate effectively with the people working for them. Line managers are the primary means that NETL uses for achieving operational control. ES&HMS communication also occurs through the NETL intranet, a secure internal website containing current versions of all NETL directives, as well as general reference information, forms, and programmatic information. The ES&HMS webpage contains

a "roadmap" that provides an overview of available information about the NETL ES&HMS.

Another example of internal communication at NETL is the biweekly regulatory review, which promotes awareness of regulatory changes and new programs. Every two weeks, federal and state agency websites are reviewed to identify changes in environmental laws, regulations, guidance documents, compliance information, and regulatory agency programs. The DOE Headquarters' website is also reviewed to check for new DOE requirements and guidance. These reviews are circulated to the ES&H staff and posted on the NETL intranet homepage.

NETL also communicates the ES&HMS to its employees through intranet, training, staff meetings, e-mail, and posters. The training program includes general ES&HMS training designed to make employees aware of the ES&HMS by providing them with information about the significant environmental aspects and the potential impacts of their work, employee roles and responsibilities, and the potential consequences of not following operating procedures. In addition to the general training, program- and job-specific training is required based on an employee's job duties. The computer-based training (CBT) system uses a job hazard survey that asks users about their work assignments to obtain information about which training modules or types of training are needed. Job-specific training for an employee can also be requested directly by the employee, or by his/her supervisor. Each employee and his/her supervisor are responsible for ensuring that all required training is complete before beginning work on an assignment.

For purposes of communication with external parties, NETL maintains an external webpage, www.netl.doe.gov that has ES&HMS information available to the public, such as the ES&H policy and the significant ES&H aspects.

NETL conducts public participation activities under the requirements of the National Environmental Policy Act (NEPA). For projects conducted offsite, NETL is required, by law, to use the NEPA process to identify potential environmental impacts, consider alternatives, invite public comment or participation, plan the project with due regard for the environment, impose mitigation requirements, and make informed decisions about whether to proceed with the proposed project. The NEPA process provides a system for reviewing actions prior to a major expenditure of funds to ensure the environmental and social impacts have been identified, analyzed, and will be mitigated to the extent practicable prior to committing to the project.

To effectively and efficiently implement the ES&HMS, NETL has to maintain operational control of its on-site R&D projects, facilities, and operations. This is accomplished through SARS. This system requires proposed projects to be described in writing and subjected to ES&H and quality reviews by various subject matter experts and technical committees. Approval must be granted before a project, operation, or facility can proceed beyond the planning stage. Included within this process is a review of the potential environmental impacts, regulatory requirements,

safety and health hazards, and monitoring plans. After a project begins, annual reviews are required to make sure the project remains within the bounds and constraints that were previously imposed. If the project requires changes, the SARS package must be modified, and the SARS review is repeated. Other processes for operational control include the following:

Environmental Programs. Baseline programs have been established for both defined media (air, surface water, and groundwater), and likely pollution routes (spills, hazardous waste, non-hazardous waste). Generally speaking, each program is described in an operating plan/procedure and is managed by a corresponding ES&H program manager.

Emergency Response System. NETL maintains processes to respond to accidents and emergency situations and for preventing or mitigating any environmental impacts that may occur. The Emergency Response Organization (ERO) conducts emergency response exercises annually and participates in emergency preparedness training.

Figure C: Morgantown Annual Emergency Exercise ESS&H Organization

This year's scenario for the Morgantown site, Figure C, involved the simulation of two student employees contaminated with hydrofluoric acid (HF) while conducting research activities in a laboratory. The incident required coordination of NETL on-site responders and resources to efficiently and effectively implement HAZMAT control, containment, decontamination, and medical response.

The annual site wide exercise at the Albany site, Figure D, involved a (simulated) fire, resulting in two entrants becoming trapped in a confined space in the basement of the facility. The resulting situation caused Albany Fire Department responders to deal with the potential atmospheric hazards associated with a smoke engulfed confined space as well as potential physical obstacles; obscured vision; communication problems; noise; and size of opening into the space.

Figure D: Albany Annual Emergency Exercise

The Pittsburgh full-scale exercise began during the early morning hours of April 15, 2009, Figure E, with (simulated) severe thunderstorms passing through the area. At 0800 hours, NETL Security received a "tornado watch" weather statement over the site weather monitor that includes Allegheny County; the NETL-PGH Incident Evaluation Team (IET) is activated and the team reports to the site emergency operations center (EOC). At 0815 hours, Security received a report of a tornado warning for the area and notified the Emergency Director and incident investigation team occupying the EOC. The Emergency Director contacted the lead NETL-PGH EOC Coordinator to activate the Management Emergency Response Team (MERT) to the on-site alternate EOC located in a conference room. The IET with the Emergency Director (ED) immediately order a sitewide shelter-in-place. At 0831 hrs, a (simulated) tornado passed over NETL causing major damage to site buildings and the surrounding community. Response to the scenario included testing notification procedures, processing severe weather alerts, testing shelter-in-place orders, emergency medical response, and hazmat/rescue team response.

Figure E: Pittsburgh Annual Emergency

The exercises were evaluated by contractors independent of DOE emergency management. An analysis of opportunities for improvement was used to develop corrective actions that are tracked until completion in NETL's AIIS database.

Contract Requirements. Work performed by contractors is controlled at the NETL sites through contractual provisions and NETL directives that define the ES&H requirements for such work on NETL property, as well as for NETL-funded work at offsite locations.

Affirmative Procurement Program. A program has been established to require that certain procurements contain recycled content, as outlined in NETL Procedure 541.2-1, Affirmative Procurement Program.

An integral part of operational control is documentation. Critical documents are controlled according to a defined process to ensure they can be located. They are also periodically reviewed and revised. This ensures that the current versions are readily available and obsolete documents are promptly disposed.

Core ES&HMS documentation is embodied primarily within the NETL ES&H directives. The most recent and official hard-copy versions of NETL directives reside with the NETL directives coordinator. Electronic versions of these controlled directives are placed on the Intranet for employee use and are considered to be official versions. Official copies of ancillary tables, lists, and forms are also maintained on the intranet and are reviewed and updated as required.

3.7 Self-Assessment Procedures and Corrective Action

NETL uses self-assessment procedures to improve ES&H performance through identification of nonconformances and tracking of corrective and preventive actions. Responsibility and authority for handling and investigating nonconformances and for initiating and completing corrective and preventive actions has been clearly defined by NETL as part of its processes. Several practices are employed, including internal audits, reviews, and inspections; independent assessments; and reporting through AIIS.

NETL conducts both internal and external audits of its ES&HMS as required by the ISO 14001 and OHSAS 18001 standards. This process is defined in NETL Procedure 450.4-14, Internal Auditing. To maintain its certifications, an annual schedule is prepared that ensures that the entire standard (for both ISO 14001 and OHSAS 18001) is audited against NETL's ES&HMS. Four ES&HMS audits were performed in 2009, including three surveillance audits by the ISO14001/OHSAS 18001 registrar, and one internal audit.

Management's commitment to the ES&HMS is evidenced by encouragement and management review of ES&H assessments. DOE and contractor ES&H specialists

participate in regular site audits and inspections, covering all NETL facilities on an annual basis. These audits and inspections focus on observable conditions of facilities (e.g., compliance with OSHA regulations, National Fire Protection Association (NFPA) codes, the National Electric Code (NEC)), and other environmental requirements). Findings are entered into NETL's corrective action tracking system, AIIS and the status of corrective actions is provided semiannually to the management review team.

Annual SARS assessments are performed on new or modified R&D projects, facilities, and support operations. In addition, annual assessments are performed to ensure continued ES&H compliance of existing projects, facilities, and support operations. A full discussion of the SARS assessment process can be found in Section 3.8, Quality Assurance.

Program reviews are conducted every three years by the responsible program managers for each major environmental program (e.g., the Water Quality Program, the Air Quality Program, and the Groundwater Program). These reviews are informal and may vary in scope and detail. During each review, the respective program managers attempt to verify that the requirements stated in the procedure are still relevant and are actually being met. When discrepancies are found, the program manager must decide whether to remove a specific requirement from the directive or to enforce it. Some programmatic reviews occur more frequently or focus on monitoring results. These reviews look for trends, with the goal of identifying correctable problems and promptly taking action.

Site-support contractor employees periodically inspect various high-risk items, document their findings, and provide the results to program managers. For example, daily inspections are performed at the hazardous waste facility, at selected potential spill sources, and at storm water outfalls. Weekly inspections are made at industrial wastewater discharge points. Quarterly discharge monitoring reports are compiled and reviewed to determine if permit limits have been exceeded. Likewise, semiannual surface water monitoring reports are compiled and reviewed. All of this information provides the program managers with an opportunity to assess the effectiveness of their programs.

Meaningful reviews for environmental compliance can occur only if the program managers remain abreast of the changing laws and regulations and any changed DOE administrative requirements. NETL has several means of maintaining current awareness of the applicable regulations and laws:

- A biweekly regulatory review provides updates to program managers. It covers major changes in laws and regulations, as posted on the websites of selected governmental agencies and as posted by the DOE Office of Health, Safety and Security (HS-1).

- Private sector publications are received by program managers, such as "Environmental Compliance in West Virginia," a quarterly regulatory update bulletin published by Business and Legal Reports, Inc.; environmental compliance updates on CD ROM, published by the Bureau of National Affairs; and various trade journals.

- Program managers also draw on the Pennsylvania Bulletin and the Pennsylvania Code, which are produced by the Commonwealth of Pennsylvania, and the Code of Federal Regulations, published by the National Archives.

- The NETL library subscribes to relevant regulatory documents.

- Program managers purchase updated lists of hazardous or regulated chemicals as needed.

- All environmental program managers periodically check the websites of regulatory agencies, such as the West Virginia Department of Environmental Protection (WVDEP), the Pennsylvania Department of Environmental Protection (PADEP), and the Oregon Department of Environmental Quality (ODEQ).

- Albany uses a regulatory review service, RegScan™, to provide for regular review of federal and Oregon state regulatory changes to ensure continued compliance with regulatory requirements.

- To develop general awareness of new areas of responsibility, program managers may take training classes on relevant statutes and regulations.

Ultimately, NETL relies on the professionalism, training, competence, and personal responsibility of the program managers, who are subject matter experts residing in the ESS&H Division, to do whatever is necessary for them to stay informed of changing laws and regulations. Part of the program manager's general job responsibilities is to stay abreast of regulatory issues that may affect the NETL ES&HMS and to take appropriate actions to implement these requirements.

- Independent Program Assessments. In addition to internal audits, NETL conducts independent assessments of its ES&H programs using an external contractor. These assessments identify strengths, weaknesses, deficiencies, and recommendations for improvement. They also provide a look at regulatory compliance and assure that noncompliances are discovered and corrected. The contractor reviews internally and externally generated documents associated with the programs and interviews program managers and other personnel. The independent assessments cover: (1) directives, policies, standards (including ISO 14001 and OHSAS 18001), permits, and regulations; (2) organization and administration; (3) staffing and training; (4)

communication and dissemination of program information; (5) documentation and reporting; and (6) performance measurement. There were three programs assessed in 2009: the Emergency Eyewash and Shower Equipment Program; the Work Permits and Special Work Program; and Spill Prevention and Control Management. The assessments found that these programs were working well and provided NETL with a few recommendations for improvement.

- Workplace Monitoring Program. In general, the systems in place with regard to the workplace monitoring program are effective and contribute to the protection of NETL workers and the environment. The system is effective in identifying workplace hazards and screening employees for the potential of exposure to those hazards. Line managers and support staff work cooperatively to reduce or eliminate exposures to employees.

  Frequent industrial hygiene monitoring has not been necessary at NETL, since engineering controls reduce personnel exposures to minimal levels. Monitoring of most activities is largely driven by the SARS process, which establishes routines for safely operating facilities or research projects, inclusive of workplace monitoring.

- Facility SARS Program. In general, the systems in place relative to the Facility SARS Program, Figure F, are effective and contribute to the protection of workers and the environment. NETL does an excellent job of training its employees to know their responsibilities; the regulations applicable to their job; and best practices related to structural engineering, mechanical engineering, and construction safety.

Figure F: Facility SARS Program

- The Facility SARS Program is used to determine the safety requirements for the design and construction of new and modified facilities. Certain selected renovation projects are done under a use permit, rather than the Facility SARS Program to reduce the administrative burden when a full SARS package would be unnecessary. The determination of whether to obtain a use permit or prepare a SARS package is made by the Office of Institutional and Business Operations director after reviewing information provided by the responsible person or facility custodian, and is based on experience and professional judgment.

Upon completion of a construction project, the facility is inspected by a team of ES&H personnel, who recommend any necessary remedies or approve the use permit. After the facility is approved for use, the inspection schedule reverts to an annual review by the ES&H staff to determine if required safety measures are still in place and operational controls are being followed. Deficiencies found during the annual inspection are documented in the corrective action tracking system (AIIS).

- Industrial Wastewater Program. The systems in place relative to the industrial wastewater program are effective and contribute to the protection of workers and the environment. Employees are trained to ensure that they know their responsibilities, applicable regulations, and best management practices related to chemical hazards, including management and disposal of hazardous materials. Additional training is provided when needed for exceptional circumstances.

Nonconformance generated from all of the self-assessment audits mentioned above are documented using the corrective action tracking system. Corrective action status is measured by data provided by AIIS; all NETL employees have access to AIIS instructions.

NETL Procedure 450.4-4, ES&H Corrective and Preventive Action Process, outlines how corrective and preventive action items identified in the various assessments performed at NETL are captured, prioritized, assigned, tracked, closed, analyzed for root causes, and incorporated, as appropriate, into the lessons learned and training systems. This process holds responsible persons and line management accountable for timely closure of corrective actions implemented within their programs, organizations, or facilities and disseminates lessons learned across appropriate organizational elements at NETL.

In brief, after completion of an assessment, the lead assessor uses the AIIS database to generate an assessment record, which is identified by a unique number. When a finding or concern is entered into the system, a unique number is assigned and cataloged in the database with the associated assessment record. A notification of the finding is sent electronically to the responsible person and line manager. All actions taken regarding the finding are then documented in AIIS. To ensure that the findings have been fully addressed, follow up is done through the internal auditing process.

Other processes used for reporting corrective actions include NETL Procedure 151.1-2, Emergency Categorizations, Classifications, and Notifications, which is used to catalog and investigate major nonconformances as required by DOE; and NETL Procedure 231.1-2, Injury/Illness Investigation and Reporting, which sets forth the minimum requirements for injury or illness and property damage investigation and reporting for NETL.

3.8 Quality Assurance

Please see Section 4.13 for a description of the NETL Quality Assurance (QA) Program, including QA for the ES&HMS.

3.9 Management Review Process

Management review of the ES&HMS ensures that the policy and system remain appropriate and effective. The ES&HMS representative conducts semiannual review meetings with the Management Review Team (MRT) (see Figure B, NETL ES&HMS Organization). During the review meetings, the MRT considers the environmental, safety and health policy, objectives, targets, internal and external audits, and other related issues. Changes are documented and implemented. Management involvement guarantees that the projects are funded and the appropriate priority is placed on the issues identified. Notes from the MRT meetings are posted to the intranet.

The MRT met one time in **2009, on** July 16, 2009,to discuss, among other issues, whether NETL would pursue ISO 9001 certification for the Morgantown and Pittsburgh facilities, changes in the ES&HMS coordinator, the inclusion of Albany's objectives and targets in the ES&HMS, and OHSAS 18001 registration for the Albany site.

COMPLIANCE SUMMARY

4.1 Major Environmental Statutes

The permit limits for the Industrial Sewer User Permit at Pittsburgh issued by the PHA were exceeded for chloroform in February 2009 and an NOV was received although the level of chloroform was higher in the background drinking water samples than in the effluent sample. Throughout the year, numerous inspections and audits were performed and documented to ensure no instances of environmental noncompliance. Those statutes included CERCLA, Superfund Amendments and Reauthorization Act (SARA), Resource Conservation and Recovery Act (RCRA), CAA, CWA, AEA, NEPA, and Toxic Substances Control Act (TSCA), and each are described in detail below.

4.2 Environmental EOs

NETL was in full compliance with all applicable environmental EOs in 2009. Throughout the year, numerous inspections and audits were performed and documented to ensure no instances of environmental noncompliance. Those EOs which apply to NETL include EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, which is described more fully in Section 4.5.1. Other EOs that apply to NETL, but for which no specific action was required in 2009, included: EO 11514, *Protection and Enhancement of Environmental Quality*;

EO 11738, *Providing For Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans;* EO 11987, *Exotic Organisms;* EO 12088, *Federal Compliance with Pollution Control Standards*; EO 11988, *Floodplain Management*; and EO 11990, *Protection of Wetlands*.

4.3 DOE Internal Environmental and Radiation Protection Orders

NETL was in full conformance with DOE Order 450.1, which is the single major internal environmental protection order applicable to NETL. NETL does not operate a radiological program of similar scope to the DOE national laboratories administered under the National Nuclear Security Administration's control. However, a limited number of sealed sources were administered in full compliance with DOE Internal Radiation Protection Order 5400.5, as discussed below.

4.4 Atomic Energy Act of 1954

The Atomic Energy Act (AEA) of 1954 and its amendments require federal control of radiation source materials for the protection of the public and workers. DOE orders, EPA regulations, and Nuclear Regulatory Commission regulations are based on the AEA. To fulfill its obligations, DOE has implemented radiation protection programs at DOE facilities that process, produce, handle, use, or dispose of radiation source materials.

NETL's sites in Albany, Morgantown and Pittsburgh do not process, produce, or dispose of radiation source materials as a part of its routine operations. The Morgantown and Pittsburgh sites use research instruments that contain sealed radiation sources. These are small quantity emitters used to make various types of measurements. Albany uses research instruments that are considered radiation-generating equipment, but Albany does not have any sealed radiation sources. The Morgantown site also has four phosphorescent exit signs located in the hazardous waste accumulation facility. Radiation safety officers maintain an inventory of these radiation sources, tracking each item, isotope(s), quantity, custodian, location, status, and activity. Table 4.4.1 lists the 2009 source inventory at Morgantown, Table 4.4.2 and Table 4.4.3 list the 2009 X-ray radiation generating devices and source inventory for Pittsburgh, and Table 10.4.1 lists the x-ray radiation generating devices at Albany.

In 2009, the Morgantown and Pittsburgh sites did not release any of the radiation source materials into the environment. All of the source materials are sealed from escape or discharge. No radiation source materials were sent to off-site storage or disposal facilities. The Albany site has legacy radiological issues, which includes the presence of ores that are naturally occurring radioactive materials.

Radiation exposure monitoring at the Albany, Morgantown, and Pittsburgh sites consisted of the use of personal dosimeter badges. Leak testing is conducted by independent contractors.

4.5 NEPA

NEPA (42 U.S.C. 4321 et seq., 1969) establishes federal policy for protecting the quality of the environment. The act establishes three levels of review for federal actions: environmental impact statements (EIS), environmental assessments (EA), and categorical exclusions (CX). Under the highest level of review, an EIS is prepared to evaluate the environmental consequences of any major federal action that might have significant impact on the quality of the environment. The EIS must include a comparative analysis of those realistically available alternatives that would accomplish the same goals that the federal action is expected to address. Based on the EIS, a Record of Decision is prepared to document which alternative will be pursued.

If it is not clear from the scope of the federal action that an EIS is necessary, or if the potential for environmental impacts from the proposed action is uncertain, the second level of review, an EA, is prepared. Based on the analysis in the EA, a determination is made that either the potential environmental impacts warrant preparation of an EIS, or the impacts are not significant and a finding of no significant impact (FONSI) can be issued.

If the federal action does not have a significant effect on the environment, either individually or cumulatively, then the third level of review, a CX, is warranted. These types of federal actions can be excluded from an in-depth NEPA review. DOE has determined that certain classes of actions do not individually or cumulatively have a significant effect on the human environment and might, therefore, be covered by a CX. A list of the CXs, as well as the eligibility criteria for their application, is identified in DOE's NEPA implementing procedures (10 CFR 1021).

NETL conducts NEPA reviews for both onsite actions and off-site actions proposed for funding by the federal government. These include actions planned in cooperation with other governmental organizations, educational institutions, and private industry.

The following EIS activities took place in 2009:

Mesaba Energy Project

Excelsior Energy was selected under CCPI Round 2 to build the Mesaba Energy Project near Hoyt Lakes in the Iron Range of Northeastern Minnesota. The objective is to design, construct, and demonstrate a utility-scale next-generation integrated gasification combined cycle (IGCC) electric power generating facility which uses the ConocoPhillips E-Gas™ carbonaceous solids gasification technology. The planned installed capacity is approximately 600 MWe (net). The final EIS Notice of Availability was published in the Federal Register on November 20, 2009. The Record of Decision has not been finalized.

Kemper County IGCC Project

Southern Company Services, Inc. was selected under CCPI Round 2 to demonstrate advanced power generation systems using Integrated Gasification Combined Cycle (IGCC) technology. In a combined cycle plant, two power generators, or cycles, are used in combination to generate electricity in a very efficient manner. Coal is first heated in a special process vessel with air and steam to drive off the gas from the coal. The gas is then cleaned and used to fire a gas turbine to generate electricity. The hot exhaust gas leaving the turbine is then used to heat water to produce steam to power a steam turbine and generate additional electricity. The IGCC demonstration plant, which will use Mississippi lignite coal, will generate approximately 550 megawatts of electricity at a site located in Kemper County, Mississippi. DOE published a Notice of Availability for the Draft EIS on November 5, 2009. A public hearing on the Draft EIS was held in DeKalb, Mississippi, on December 1, 2009, and the comment period closed on December 21, 2009.

4.6 EO 13423 and EO 13514

On January 24, 2007, former President Bush signed EO 13423 Strengthening Federal Environmental, Energy, and Transportation Management. This EO established various sustainability goals for federal agencies including:

- Acquisition of goods and services that use sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products
- Use of paper with at least 30 percent post-consumer fiber content
- Reducing the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed
- Increasing diversion of solid waste as appropriate
- Maintaining cost-effective waste prevention and recycling programs
- Meeting at least 95 percent of the requirements for EPEAT-registered electronic products, unless there is no EPEAT standard for such product
- Enabling the Energy Star feature on computers and monitors
- Establishing and implementing policies to extend the useful life of electronic equipment
- Using environmentally sound practices relative to disposition of electronic equipment that has reached the end of its useful life

Subsequently, on October 5, 2009, President Obama signed EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance. And while E.O. 13423 was not revoked by the signing of the new EO; i.e., its goals and requirements continue to remain in effect, the new E.O. (13514) establishes even more aggressive sustainability goals including:

- Increase energy efficiency
- Measure, report, and ultimately reduce greenhouse gas (GHG) emissions from direct and indirect activities
- Conserve and protect water resources through efficiency, reuse, and storm water management
- Eliminate waste, recycle, and prevent pollution
- Leverage Departmental acquisition to foster markets for sustainable technologies and environmentally preferable materials, products, and services
- Design, construct, maintain, and operate high performance sustainable buildings in sustainable locations
- Strengthen the vitality and livability of the communities in which DOE facilities are located
- Inform DOE employees about, and involve them in achieving the goals of E.O. 13514

The goals of these two EOs, 13423 and 13514, have become the cornerstone of NETL's ES&HMS. NETL has considered the requirements of these orders when developing its list of Significant ES&H Aspects, its Objectives and Targets, and ultimately, the associated EMPs. Below is a summary of the Significant ES&H Aspects that address E.O. 13423 and E.O. 13514, and the EMPs used to achieve the respective objectives and targets.

For CY2009, the EMPs addressing Nonhazardous Waste Generation, Hazardous Waste Generation, and Recycling developed objectives and targets established to address the requirements of E.O. 13423. For example, the CY2009 Nonhazardous Waste Generation Plan had the overall objective of reducing the amount of nonhazardous waste generated by 75 percent by 2010, using a 1993 baseline of 641 metric tonnes. By the end of CY2009, NETL had achieved an 80 percent reduction in nonhazardous waste generation. Similarly, to address the goals of E.O. 13514, in the newly established FY2010 EMP for Nonhazardous Waste Reduction, NETL set its objective to reduce the amount of routine nonhazardous waste by 3 percent per year using an FY2008 baseline of 222.5 metric tonnes. In the first quarter of FY2010, NETL was able to reduce nonhazardous waste by 36.2 metric tonnes.

Likewise, based on E.O. 13423 requirements, the overall objective of the CY2009 EMP for Hazardous Waste Generation was to reduce routine hazardous wastes generated by 90 percent by 2010, using a 1993 baseline of 18.46 metric tonnes. By the end of CY2009, NETL had achieved a 92 percent reduction in hazardous waste. In addition, to address the goals of E.O. 13514, NETL's FY2010 EMP for Hazardous Waste Reduction established the objective to reduce the amount of routine hazardous waste by 14 percent using an FY2008 baseline of 2.5 metric tonnes. For the first quarter of FY2010, NETL was able to achieve a reduction of 0.39 metric tonnes and is expected to meet its fiscal year target.

Similarly, the CY2009 EMP for Recycling had the objective of increasing recycling of sanitary waste streams to 50 percent by the end of 2010, using a 2002 baseline of 31 percent. By the end of CY2009, NETL had achieved 56 percent recycling of sanitary waste streams. In addition, to address the goals of E.O. 13514, the FY2010 EMP for Recycling was revised to increase diversion of solid waste as appropriate and to divert 50 percent of nonhazardous solid waste from disposal by the end of FY2015, using an FY2008 baseline. For the first quarter of FY2010, NETL was able to achieve 47 percent recycling. NETL also established an EMP for Recycling Construction Waste. The overall objective of the plan is to recycle a minimum of 35 percent of construction/demolition waste and divert it from landfill disposal by the end of FY2015, using a FY2010 baseline. NETL will be establishing the baseline in FY2010.

NETL received a National Partnership for Environmental Priorities Program (NPEP) Recognition Award for 2009. The NPEP is a waste minimization program run by the EPA. This voluntary program encourages results by publicly recognizing and showcasing the source reduction, recycling, and advanced manufacturing accomplishments of Member Partners who commit to reducing wastes containing the Waste Minimization Priority Chemicals. NETL recently reduced its inventory of mercury by 140 pounds and was recognized by the EPA for its efforts. The mercury was sent offsite to be recycled. This goal was achieved by replacing mercury-containing equipment with environmentally safe substitutes and disposing of stored equipment that contained mercury. And, for the third year in a row, NETL has been identified as an EnviroStar award winner by the ACHD. As mentioned earlier, NETL was one of six organizations in the Pittsburgh area to receive the award and the only organization to receive a three-star rating.

Energy and Fuel Use

The CY2009 EMPs addressing Energy and Fuel Use also have objectives and targets addressing the requirements of E.O. 13423. The EMP for Energy Use had the overall objective of reducing energy usage/square foot by 3 percent annually through the end of FY2015 (to 30 percent) using an FY2003 baseline. By the end of CY2009, NETL had achieved a 26 percent reduction in energy use. Similarly, to address the goals of E.O. 13514, the revised FY2010 EMP included the 3 percent per year reduction, as well as focusing on reducing the energy intensity in buildings to

achieve greenhouse gas reductions. For the first quarter of FY2010, NETL was able to achieve an energy intensity reduction of 17 percent.

The CY2009 EMP for Renewable Energy had the objective to increase renewable energy consumption to 3 percent in 2009and to ensure the use of statutorily required renewable energy consumed is 50 percent of total. While NETL achieved a 5 percent increase in renewable energy consumption, it did not meet the requirement that 50 percent of the renewable energy statutorily required sources. Likewise, to address the goals of E.O. 13514, the revised FY2010 EMP included the overall objective to ensure that 50 percent of statutorily required renewable comes from "new" (developed after 1999) sources, and to increase use of renewable energy. For the first quarter of FY2010, NETL was able to achieve 0.77 percent use of renewable energy.

The CY2009 EMO for Petroleum Fuels had the overall objective to reduce the vehicle fleet's total consumption of petroleum products by 2 percent annually through the end of FY2015 using an FY2005 baseline. In CY2009, NETL was able to reduce petroleum consumption by 26.2 percent, which was 18 percent over its target. Similarly, in addressing the goals of E.O. 13514, the FY2010 EMP extended the requirement of a 2 percent annual reduction of petroleum fuels through FY2020. In the first quarter of FY2010, NETL was able to reduce petroleum consumption by 21 percent.

The CY2009 EMP for Alternative Fuels had the overall objective to increase the total fuel consumption that is nonpetroleum-based by 10 percent annually through FY2010,using an FY2005 baseline, NETL more than surpassed this objective with an increase in alternative fuel usage by 126 percent. Furthermore, in addressing the goals of E.O. 13514, the FY2010 EMP continues to promote alternative fuel consumption and increased use of low-GHG-emitting vehicles. NETL’s target for FY2010 is to increase the number of alternative fuel vehicles on site to 57.

Also, in the Energy and Fuel Use area and regarding E.O. 13514, NETL established an EMP for Management of Federal Data Centers. The overall objective of the plan is to implement best management practices in energy efficient management of servers and federal data centers. In the first quarter of FY2010, NETL involved the development of a Data Center Energy Efficiency Optimization Plan that will be submitted to DOE HQ.

Hazardous Materials Procurement, Consumption, and Storage

For the CY2009, the EMP addressing Hazardous Materials Procurement, Consumption, and Storage had an established objective and target to address the requirements of E.O. 13423. The CY2009 Chemical Inventory EMP had the objective of reducing the quantity of toxic and hazardous chemicals and materials acquired, used, and disposed. By the end of CY2009, NETL had established the baseline of EPA’s 31 priority chemicals. Similarly, to address the goals of E.O.

13514, NETL established an FY2010 EMP for EPA Priority Chemicals with the objective of reducing and minimizing the quantity of toxic and hazardous chemicals and materials acquired, used, and disposed by FY2015. For the first quarter of FY2010, NETL began to reduce the inventory of toxic and hazardous chemicals that are on the EPA's list of 31 Priority Chemicals. NETL also established an EMP for Green Chemical Alternatives to increase the use of acceptable alternative chemicals and processes.

Air Emissions/Greenhouse Gas Emissions

The CY2009 EMP addressing Greenhouse Gas Emissions had established objectives and targets to address the requirements of E.O. 13423. The CY2009 EMP had the overall objective of reducing greenhouse gas emissions attributed to facility use through life-cycle cost effective measures by 30 percent by 2010, using 1990 as a baseline (67.4 million lbs). By the end of CY2009, NETL had achieved a reduction in CO_2 emissions, which equates to a reduction of 62 percent, when compared to the 1990 baseline. Likewise, to address the goals of E.O. 13514, the FY2010 EMP for Greenhouse Gas Emissions sets objectives to include continuing the reduction in greenhouse gas emissions by reducing energy intensity 3 percent annually or 30 percent by the end of FY 2015, using a baseline of FY 2003; establishing agency-wide GHG emission percentage reduction targets by FY2020, using a FY2008 baseline; preparing a baseline of GHG emissions for Scope 1 and Scope 2 emissions by January 3, 2010; and preparing a baseline of GHG emissions for Scope 3 emissions by June 2, 2010. NETL also established an FY2010 EMP for Greenhouse Gas Emission Reporting that includes: reporting comprehensive GHG emission inventory for FY2010 by January 5, 2011, and annually thereafter by the end of January; implementing transit, travel, training, and conferencing strategies to support low-carbon commuting and travel; and implementing innovative policies to address Scope 3 emissions unique to agency operations.

Green Purchasing

The CY2009 EMP for Green Purchasing specifically addressed the requirement in E.O. 13423 to increase the purchase of electronic products (to 95 percent) that meet the requirements of being an electronic product environmental assessment tool (EPEAT)-registered electronic product, unless there is no EPEAT standard for such product. For CY2009, 100 percent of NETL’s electronic purchases were EPEAT-certified. Also, in FY2010, Electronic Stewardship, primarily procurement, became a significant aspect, and as such the EMPs are covered under that aspect.

Electronic Stewardship

To further address the goals of E.O. 13514, NETL established an FY2010 EMP for Purchase of Electronic Products to ensure procurement of EPEAT-registered electronic products, and the procurement of Energy Star- and Federal Emergency Management Program (FEMP)-designated electronic equipment. NETL also

established an FY2010 EMP for Operation and Maintenance of Electronic Products to enable power management, duplex printing, and other energy-efficient or environmentally preferable features on all eligible DOE electronic products.

Wildlife Management/Pest and Other Landscaping Management

The CY2009 EMP for Wildlife Management had the overall objectives to reduce the deer population at the Pittsburgh and Morgantown sites and to implement a Wildlife Management Program. For CY2009, NETL continued discussions with the USDA on Wildlife Management Plan implementation and culled 20 deer from the Morgantown site. Similarly, to further address the goals of E.O. 13514, NETL expanded the plan for FY2010 to Pest and other Landscaping Management with the continued objective of maintaining the deer at a sustainable level per the wildlife management plan, and with the objective of implementing pest management and other landscaping management practices.

Water Usage

The CY2009 EMP for Potable Water Intensity was established with the objective and target to address the requirements of E.O. 13423 to reduce water consumption intensity, relative to the baseline of the agency's water consumption in fiscal year 2007, through life-cycle cost-effective measures by 2 percent annually through the end of fiscal year 2015 or 16 percent by the end of fiscal year 2015. NETL met its CY2009 goals for water intensity reduction by achieving a 30 percent reduction in water intensity. Likewise, to address the goals of E.O. 13514, NETL extended the plan for FY2010 for Potable Water Consumption to FY2020. In addition, NETL established an FY2010 ES&H Plan for Industrial Water Consumption, with the objective of reducing industrial water consumption by 2 percent annually, or 20 percent by the end of FY2020, using a baseline of FY2010 industrial consumption. In FY2010, NETL will be establishing the baseline data.

High Performance Sustainable Building Implementation

To address additional goals set forth in E.O. 13514, NETL established five new FY2010 ES&H Plans. The first plan, High Performance Sustainable Building Implementation, has the objective to obtain LEED Gold Certification for B-39 in Morgantown. The second plan, High Performance Sustainable Building (HPSB) Criteria, has the objective to increase the number of buildings over 1,000 square feet that meet HPSB criteria to 15 percent by 2015. The third plan, Sustainable Practices in Design/Construction Packages, has the objective to increase the number of Environmental Preferred Products (EPA-, Energy Star-, or FEMP-rated) purchased and installed in design and construction projects. The fourth plan, High Performance Sustainable Buildings, has the objectives to ensure that all new construction, major renovation, or repair and alteration complies with the Guiding Principles; to ensure 15 percent of existing facilities and building leases (above 5,000 gross square feet) meet the Guiding Principles by FY2015; and to make annual progress towards 100 percent

conformance with the Guiding Principles. Finally, the FY2010 ES&H Plan for Historic Buildings promotes long-term viability of agency-owned historic buildings by ensuring that rehabilitation utilizes best practices and technologies in retrofitting.

While E.O. 13423 further defined goals for energy intensity, renewable energy, and transportation management, it also mandated changes to NETL's energy management program. In response, NETL has aggressively pursued the most energy efficient management of facilities possible. For example, lighting retrofits are a routine part of all construction and renovation packages. Inefficient fixtures are replaced with more efficient, 277-volt Energy Star-rated, electronic-ballast fluorescent fixtures. Motion sensors have been installed to conserve energy in areas that are not used frequently. NETL consistently incorporates energy efficient designs, Energy Star-rated equipment, and FEMP-approved equipment into construction packages, renovation packages, and maintenance projects.

E.O. 13423 redefines Public Law 109-58, the Energy Policy Act of 2005 (EPact05) that established updated performance objectives for the federal government. Those performance objectives require a reduction in energy intensity and water consumption intensity, and the incorporation of high-performance sustainable building practices.

E.O. 13423 requires a reduction in energy intensity (energy consumption per square foot of building space) of 3 percent per year from FY2006 through FY2015, based on a 2003 baseline. This will result in an overall 30 percent reduction in energy intensity (energy use/gross square feet) by 2015. The EPact05 requirements reestablished by E.O. 13423 include the following electricity procurement requirements: from FY2006 through FY2009, at least 3 percent of NETL's total electricity supply must be derived from renewable energy; from FY2010 through FY2012 at least 5 percent of the total electricity supply must be derived from renewable energy; and from FY2013 and beyond, at least 7.5 percent of the electricity must be derived from renewable energy. E.O. 13423 also requires that 50 percent of the above-mentioned renewable energy is generated from renewable energy sources that were developed after 1990.

During FY2009, NETL continued to implement projects in construction, maintenance, and energy retrofits that addressed mandated goals identified in E.O. 13423 and DOE Order 430.2b. In October of FY2009, NETL was awarded the "2008 Transformational Energy Action Management Comprehensive Project" sponsored by DOE and its Federal Energy Management Program. This award recognized a DOE site or combination of sites that successfully used alternative financing mechanisms to achieve the broadest range of EO 13423 and TEAM Initiative goals.

E.O. 13423 also requires a reduction of water consumption intensity (water use per square foot of building space) through life-cycle cost-effective measures. This reduction must be at least 2 percent per year from 2008 through 2015, or 16 percent by the end of FY2015 using FY2007 as the baseline.

In addition, E.O. 13423 requires new DOE building design, construction, and major renovations to comply with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (HPSB) set forth in the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (2006). It also requires that 15 percent of the existing federal capital asset building inventory of NETL at the end of FY2015 incorporate the sustainable practices established in these guiding principles. During FY2009 NETL's TSF Building 39 was awarded United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Gold Certification Rating. Building 39 "Technology Support Facility" (TSF) LEED Gold Certification Rating qualifies it as a High Performance Sustainable Building and therefore counts towards meeting the Guiding Principles for Federal Leadership in High Performance Sustainable Buildings MOU. In the fourth quarter of FY2009, NETL completed designs on Morgantown's Day Care facility. The designs were approved for construction and a construction contract was issued to begin construction. When completed in late FY2010, the Morgantown Day Care Facility will incorporate many energy efficiencies, innovative sustainable features, renewable energy projects, and capturing of outdoor light to qualify this building for a USGBC LEED Platinum Certification. During FY 2009, NETL staff completed a HPSB survey of its existing buildings > 1000gsf. The Survey identified various buildings at NETL campuses that can meet the 15 percent HPSB goal. The survey provided a preliminary table of NETL HPSB building candidates as displayed in Table 4.6.1.

In 2009, NETL continued implementing numerous actions to meet or exceed each of the mandated goals of EO1 13423. This included procuring energy efficient products; utilizing energy saving performance contracts; and, finally, updating design, construction, renovation and maintenance packages to incorporate new federal building design and performance standards, procure renewable energy, and implement innovative energy management technologies and water conservation measures.

In FY2009, NETL updated its Comprehensive Energy Management Plan and reconfigured and renamed it "NETL's 2009 Executable Plan for Energy Management." This reconfiguration and renaming better aligned NETL's Plan with DOE's Executable Plan. The reconfigured plan included strategies and annual implementation steps to insure compliance with EPact05, E.O. 13423, DOE Order 430.2b, and the Energy Independence and Security Act of 2007 (EISA07). The plan includes requirements consistent with the new DOE Order 430.2b, as well as an energy curtailment plan for use during an emergency.

As a part of every decision to undertake new projects and investments, NETL performs life-cycle cost analyses. In 2009, these analyses were used for projects involving equipment retrofit and replacement, renewable energy, lighting retrofit, water savings, and Heating, Ventilation, and Air Conditioning (HVAC) control. These analyses, coupled with energy efficiency, renewable energy and water efficiency mandates by DOE, will help determine the optimum time to undertake a

retrofit project during the life span of equipment or facilities. To further guide the decisions about priorities for energy efficiency improvements to infrastructure, NETL, during fiscal year renovations, conducts specific construction project energy audits. Additionally, NETL's Ten-Year Plan includes energy efficiency upgrades and water conservation projects in its general plant project (GPP) budget requests.

DOE Order 430.2b also recommends that sites maximize utilization of third-party financing, in particular, Energy Savings Performance Contracts, ESPC, to accomplish the mandated goals associated with the previously mentioned federal government directives. Under that premise, on August 28, 2009, NETL awarded a Biomass Alternative Methane Fuel Energy Savings Performance Contract (BAMF ESPC) to Constellation Energy, a Mid-Atlantic Energy Services Company (ESCO). The BAMF ESPC contract incorporates installation and implementation of 13 energy conservation measures (ECMs) at the laboratory's sites in Morgantown West Virginia, Pittsburgh PA, and Albany, OR.

During FY2009, NETL began installation of the 13 Energy Conservation Measures identified in the BAMF ESPC (see Table 4.6.1) that is Constellation Energy's Delivery Order 4 schedule. The DO-4 schedule identifies guaranteed Electrical Energy, Natural Gas, and Potable Water savings as well as implementation cost to install the ECMs. Once all of the ECMs have been installed, commissioned, and accepted by NETL, the annual energy savings are guaranteed to be 23.8 BBtu with an annual guaranteed cost savings of $757,929. Of the 13 ECM identified in the BAMF ESPC, NETL initiated and completed six during FY2009. These include:

- ECM#1 Steam Biogas Conversion: Constellation Energy will install six natural-gas-fired low-pressure steam boilers and two low-pressure hot water boilers. These boilers would use the site delivered landfill gas as their fuel. This would remove NETL from the NIOSH coal-fired central steam plant at the Pittsburgh Campus.

- ECM #7 and #8 Lighting Improvement at NETL Pittsburgh and Morgantown: This included replacing T-12 lamps with T-8 and T-5 lamps and fixtures sitewide, replacing two magnetic ballast with I high-efficiency electronic ballast in the existing fluorescent fixtures and replacing incandescent exit signs with LED exit signs.}

- ECM #9 HVAC Control Improvements at NETL Morgantown: This included installing new air handling controls in B-4 and B-6 and programmable thermostats in various buildings at the Morgantown Campus.

- ECM#12 Compressed Air Improvements: This includes replacing the manually actuated exhaust air damper with a new electronic actuated damper that will allow for automatic operation of the damper as a function of outside air temperature. This action provides heat for the building in the heating season w/o any additional heating supply. The second upgrade for the

Compressed Air Improvement includes upgrading the control package for the desiccant compressed air dryer and sensors from the existing continuous operations cycle to a purge cycle set as a function of air compressor load.

- ECM #13 Advance metering: Constellation Energy will install all utility metering per building in buildings greater than 1,000 gross square feet. This ECM will enable NETL to meet the EO 13423 mandates of metering all Federal buildings while providing sub-metering at the building level to monitor energy usage.

The implementation of the BAMF ESPC will provide NETL with an energy savings of 24 percent from its FY2003 baseline, which is the equivalent to meeting 79 percent of its 2015 goal. The BAMF ESPC, when fully implemented using 2007 usage as a baseline, will provide NETL with a 13 percent water intensity savings, which equates to meeting 79 percent of its 2015 savings goal. This project does not require any capital equipment cost outlays by NETL. The guaranteed annual energy cost savings provide the funding for Constellation Energy to implement the project.

NETL was able to achieve the 12 percent reduction in energy consumption per square foot of building use (required by EPact05) in FY2009 using FY2003 as the base year. Energy use at NETL was 219,903 Btu/gross square foot (energy intensity) in FY2003, while energy use was 156,821 Btu/gross square foot during CY2008. This equates to a 28.7 percent reduction in energy intensity. This reduction in energy intensity was achieved in part through the Pittsburgh site's procurement of 100 percent of its natural gas needs from a local landfill. This source of natural gas is provided through the natural gas utility supplier. The DOE Office of Federal Energy Management Program has identified landfill natural gas as a renewable energy source.

The FY2009 through FY2012 contribution from landfill gas use at Pittsburgh will help reduce NETL's energy intensity for both renewable energy sources and long-term renewable sources as identified in Table 4.6.1.

While neither EPact05 nor E.O.13423 define a goal for greenhouse gas reductions, the goal established in E.O. 13123 is generally applicable for greenhouse gas reductions. E.O. 13123, which defined greenhouse gas as carbon dioxide (CO_2) only, established a goal of 30 percent reduction by FY2010 using FY1990 as the base year. NETL received authorization from the DOE Federal Energy Management Program to allow credit for reducing greenhouse gas emissions through the use of landfill gas. This is permitted because landfill gas reduces methane emissions, which are considered to be more environmentally damaging than CO_2 emissions.

In FY2009, NETL greenhouse gas emissions were estimated to be 50,442,367 lbs equivalent of CO_2. Using the FY1990 baseline of 67,849,829 pounds of CO_2 yields a 25.7 percent reduction for 2009. The success in reducing greenhouse gas emissions has been achieved by the following: reduction in electricity, natural gas, and steam,

credit for using landfill gas, and installation of new multi-stage central steam plant boilers at the laboratory's Morgantown site.

NETL has reduced consumption of petroleum products primarily through the use of ethanol (E85) and natural gas in alternative-fueled vehicles. DOE defines petroleum products as oil, gasoline, diesel fuel, liquefied petroleum gas (LPG), and propane. NETL does not typically use petroleum products for heating buildings. Only forklifts, front-end loaders, snow-removal equipment, and lawn care equipment utilize petroleum products. This equipment is generally fueled using gasoline and diesel fuel. Alternate fuel systems have been installed at both Morgantown and Pittsburgh. These alternative fuel systems include a mixture of 85 percent ethanol-15 percent gasoline (E-85) and compressed natural gas (CNG) vehicle refueling stations. During FY2009, NETL continued operation of its E-85 refueling stations at both Morgantown and Pittsburgh. During FY2009, NETL continued operations of its CNG facility at the Pittsburgh site for a limited number of natural-gas- fueled vehicles. The E-85 and CNG facilities are helping NETL meet the alternate-fueled vehicle goals as defined in E.O. 13423, Secretary's Team Initiative of 2009 and DOE O 430.2b.

4.7 Compliance and/or Cleanup Agreements

There were three ongoing compliance activities in the State of Wyoming during 2009. Two sites required ongoing active remediation activities, and one site has been cleaned up and is subject only to vegetation surveillance monitoring. The other two are active sites in which the groundwater is contaminated with VOCs and SVOCs. Organic contaminants of concern are primarily benzene, toluene, ethyl benzene, and isomeric xylene (BTEX) compounds. Underground coal gasification and oil shale retorting tests resulted in ground water contamination at the two active sites.

Remediation activities continued at the Rock Springs Oil Shale Retort Project Site near Rock Springs, Wyoming, in 2009. Air sparge/bioremediation activities were suspended at sites 4, 6, 7, 9, and 12 to allow for evaluation of the groundwater contaminants. Many of the groundwater sampling results are above the Wyoming Department of Environmental Quality (WDEQ) water quality standard of 5 parts per billion (ppb) for benzene. Additional air sparge/bioremediation activities will be required. WDEQ recommended in December 2008 that an independent evaluation of this project, along with the Hoe Creek project be conducted. The evaluation report was expected to be completed in August 2010.

Remediation activities continued at the Hoe Creek Underground Coal Gasification Project at the Hoe Creek III site in 2009. No active remediation has occurred since May 2008 to allow for evaluation of additional contaminants that had leached into the groundwater from source materials. No groundwater monitoring wells have contaminant levels above the WDEQ standard of 5 ppb as of October 2008. No further active remediation will be conducted until results of the independent evaluation report are available.

The DOE Hanna Underground Coal Gasification Project, near Hanna, Wyoming, is complete except for vegetation evaluation. Vegetation sampling was conducted in 2006-07 and is currently being evaluated by the WDEQ. Release of the reclamation performance bond and permit termination is anticipated in 2010.

4.8 Environmental Violations Cited by Regulators

The permit limits for the Industrial Sewer User Permit at Pittsburgh issued by the PHA were exceeded for chloroform in February 2009 and an NOV was received although the level of chloroform was higher in the background drinking water samples than in the effluent sample.

4.9 Notices of Violation, Notices of Deficiency, Notices of Intent to Sue, and Other Enforcement Actions Issued

Groundwater

The Albany site began a groundwater monitoring program as a voluntary effort onsite in 2001 and offsite in March 2005. Certain VOCs at levels above the state of Oregon's risk-based standards both in the groundwater at the Albany site and beneath Liberty Elementary School located adjacent to the site were discovered at the times noted above. NETL continues to monitor the groundwater both onsite and offsite, perform applicable site investigations, document applicable risk assessments, and act as a voluntary participant in ODEQ's Cleanup Program. At no time have students, faculty, or staff of the elementary school received any adverse or harmful exposures. NETL works closely with ODEQ to investigate the nature and extent of the contamination, as well as to assess appropriate remediation methods. No enforcement action has been initiated by O DEQ against the DOE as of the end of 2009.

Current plans include the continued development of a site investigation report to document work efforts to date. Once the investigation is complete, subject to need and availability of funds, NETL will assess the results, conduct a phased risk assessment, and determine appropriate remedial actions. NETL will continue to cooperate with the Oregon DEQ in conducting these activities.

Beryllium

In 2005, beryllium surface contamination above the threshold limits for contamination specified in 10 CFR Part 850 was discovered in several buildings at the Albany site. In response, the Albany site, then known as the Albany Research Center, began a systematic process of identifying all beryllium-contaminated areas and evaluating potential levels of residual beryllium throughout the site. The Albany Research Center also implemented worker safety measures, including the provisions of 10 CFR Part 850 for establishing a Chronic Beryllium Disease Prevention Program.

In 2007, NETL completed testing at the facility for the potential spread of beryllium and characterized the site by performing beryllium inventory sampling. Based on the data collected, NETL compiled a prioritized list of areas requiring remediation and issued a solicitation for the remediation work. All remediation work was completed by the end of FY 2009.

Inadvertent Disposal of Hazardous Wastes

In July 2008, a beryllium remediation contractor began a comprehensive project to remove legacy contamination of beryllium dusts at the Albany site. This potential violation centered around the remediation of B-4, which began on April 6, 2009, and was completed by October 2009. During the remediation, the building was not accessible by employees. Following completion of all remediation and verification activities, as well as some needed electrical work, B-4 was re-opened. Upon initial re-entry to B-4 by NETL personnel, it was discovered that some laboratory chemicals and other research materials were missing from inside this building. The site's chemical inventory for this building was then reviewed. A site-wide search was made for the missing materials based on the inventory over the next two days. A small number of missing materials were found, while the remaining potentially hazardous materials remained unaccounted for. Because the materials remained unaccounted for, NETL presumed the materials had been in B-4 and were inadvertently transported as waste to the landfill. These included various laboratory stock materials or reagents in different forms, including iron, cobalt, and nickel powders and certain metal carbides. These missing materials were not considered wastes at the time of their removal from the laboratory; they were considered to be valuable source materials for various metallurgical and materials science research efforts that took place in that building.

NETL self-reported this inadvertent improper disposal to ODEQ on October 30, 2009. The disposal is estimated to have occurred between July 29, 2009, and September 17, 2009, based on dates from several manifests believed to be connected with the remediation of B-4. The materials were manifested for disposal as nonhazardous wastes when they were considered hazardous due to reactivity. The waste disposal facility in Arlington, OR, also had a licensed hazardous waste disposal area. On November 2, 2009, it was confirmed by the landfill operator that the materials removed from B-4 were indeed disposed of in the Subtitle C area of the landfill and thus presented no risk or hazard to the environment. ODEQ issued a Warning Letter to NETL regarding hazardous waste violations. NETL complied with all information requests from ODEQ, which included a full accounting of the circumstances surrounding the disposal as well as a corrective action plan.

4.10 Reportable Occurrences

The Morgantown site filed one safety- and health-related occurrence report with the DOE Occurrence Reporting and Processing System (ORPS) in 2009. The occurrence was a demolition contractor damaging a potential lead fume exposure by conducting torch cutting operations on surfaces coated with lead based paint. It was categorized as a possible personnel exposure to chemical, biological or physical hazards above limits established by the Occupational Safety and Health Administration or American Conference of Governmental Industrial Hygienists. It was later established that the contractors in question did not have any elevated lead concentrations in their blood.

The Pittsburgh site filed two environmental release-related occurrence reports with ORPS in 2009. The first occurrence involved a Notice of Enforcement Action Letter of Violation based on findings made on the quality of wastewater discharge. The occurrence was categorized as a written notification from an outside regulatory agency that the facility was considered to be in noncompliance with a schedule or requirement. The second occurrence involved storm water discharge turbidity resulting from the flushing of fire hydrants at the NETL Pittsburgh location. The incident was categorized as a release of a substance from a DOE facility that must reported to an outside agency.

The Albany site filed two environmental-related occurrence reports with ORPS in 2009. The first involved the receipt of two notices of noncompliance associated with hazardous waste disposal. The occurrence was categorized as a written notification from an outside regulatory agency that the facility was considered to be in noncompliance with a schedule or requirement. The second occurrence involved the inadvertent mixing and disposal of hazardous waste with non-hazardous waste. The incident was categorized as release of a substance from a DOE facility that must reported to an outside agency.

4.11 Major Issues, Instances of Non-compliance, and Corrective Actions

There were no major issues, instances of non-compliance, or corrective actions at NETL in 2009. Concerns over potential groundwater contamination with VOCs and surface contamination of beryllium at the Albany site are discussed in Section 4.9.

4.12 Status of Ongoing Third-Party Inspections, Self-Assessments, and Environmental Audits

NETL continued to maintain ISO 14001 and OHSAS 18001 certifications at the Morgantown and Pittsburgh sites in 2009, and its ISO 14001 and ISO 9001 certifications at the Albany site. Three surveillance audits and one internal audit were performed in 2009.

The first ISO 14001/OHSAS 18001 surveillance audit was conducted March 4-5, 2009, at the Morgantown and Pittsburgh sites and involved the surveillance of NETL's

ISO 14001/18001 certification and conformance, respectively. The audit did not result in the identification of any new nonconformances. In addition, the three minor nonconformances from the previous surveillance audit were effectively closed out. The audit did identify four strengths and four opportunities for improvement in NETL's ISO 14001 and OHSAS 18001 programs.

The second surveillance audit #2 was conducted October 28-29, 2009, at the Morgantown and Pittsburgh sites. The audit resulted in three minor nonconformances. Two of the minor nonconformances dealt with lockout/tag out (locks not returned to the lock board and a specific instance of the procedure not being followed on a project), and the other nonconformance was with regard to the need for current versions of standards being available to employees in hard copy (in the library) or via the internet. The audit also identified four strengths and two opportunities for improvement within the ISO 14001/OHSAS 18001 program implementation.

A surveillance audit was also conducted at the Albany site November 23–24, 2009, for the site's ISO 14001 and ISO 9001 certifications. No nonconformances were identified. The auditor identified four strengths and four opportunities for improvement within the ISO 14001 and ISO 9001 programs.

In terms of self assessment, NETL held training sessions for its internal auditors in August 2009 at all three sites. Subsequently, an internal audit was held at all three sites during the period, August 26-September 15, 2009. This was the first audit combining all three sites. In most cases, an attempt was made to avoid conflict of interest. In addition, internal auditors from each site were assigned to the specific audit to ensure that perspectives from each site were obtained. Since this was a more comprehensive audit, more findings within the ES&HMS were identified. They included 17 nonconformances (NCs), 29 opportunities for improvement, and three good practices.

For both the surveillance audits and the internal audits, the lead assessor placed the findings and the opportunities for improvement into NETL's corrective action system (AIIS) to ensure that they were tracked and completed.

4.13 Summary of Environmental Permits

A summary of environmental permits for the Morgantown site is provided in Table 4.13.1, and a summary of environmental permits for the Pittsburgh site is provided in Table 4.13.2 The Albany site maintains a wastewater discharge permit with the City of Albany, as shown in Table 4.13.3.

4.14 Emergency Preparedness

NETL is working toward compliance with the National Incident Command System (NIMS) training requirements for emergency responders and requirements for Mutual Aid Agreement (MAA) content with local community response organizations.

Emergency response directives were reviewed and revised to reflect corrective actions and changing response requirements.

NETL emergency management has identified the community response organizations with which NETL should have MAAs. Several MAAs with local response agencies were successfully negotiated. Some MAAs were new for 2009, while others were revised to reflect the requirements of NIMS and changing contact information for NETL program representatives.

The regularly scheduled review of the hazards assessments for the Morgantown, Pittsburgh, and Albany sites was begun.

The NETL Continuity of Operations Plan was tested in 2009 through NETL's participation in the national continuity exercise with DOE HQ, and through emergency response exercises. Evaluator comments indicated that the plan was difficult to execute, so a procedure was written to mimic emergency response execution procedures. The new procedure includes checklists and position specific instructions for continuity emergency responders.

4.15 Quality Assurance

NETL is responsible for a wide range of work activities, including basic and applied on-site research; contract administration for off-site research, development, and demonstration projects; design, construction, operation, modification, decommissioning, and environmental remediation of NETL facilities; and the management and oversight functions related to these activities. NETL's Quality Assurance (QA) Program provides the tools to ensure that this work is accomplished safely while minimizing potential hazards to the public, site workers, and the environment. The QA Program is based on DOE's ISM principles, Figure G, ISM core functions, and DOE Order 414.1C, *Quality Assurance*. Line management accountability for ES&H issues is an integral part of the QA Program and ISM. NETL implements this through work performance goals for which all line managers are accountable. Internal assessments and audits also ensure that line managers are accountable for their ES&H responsibilities.

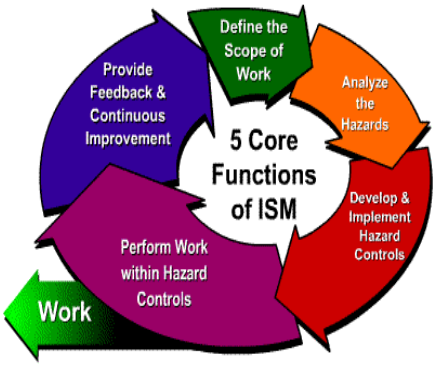


Figure G: DOE's ISM Principles

Another principle of ISM is competence commensurate with responsibilities. NETL's ES&H training program provides a process for ensuring that employees get the appropriate ES&H training they need to protect themselves, their coworkers, the public, and the environment.

NETL uses a computer-based job hazard survey to identify both general and specific ES&H training courses that employees need. As part of NETL's existing CBT system, employees are fed survey questions that focus on the potential hazards and responsibilities associated with their job/s. The survey then follows up with an e-mail to the employee identifying appropriate training. In addition, training needs are also identified and documented through the SARS process. This analysis defines requirements to demonstrate competency, including appropriate education, training, and experience, as well as an understanding of the importance of NETL's environmental aspects for project design and operation, including support operations. ES&H training records are managed through the CBT system, DOE and contractor human resource departments, and official SARS files.

The SARS process is the backbone of NETL's QA Program for ES&H. Much of the needed data regarding hazards and environmental impacts are generated from this process; therefore, it is important that it work effectively. NETL has three distinct SARS processes: one for R&D, one for facilities, and one for support operations.

At Morgantown and Pittsburgh, the R&D SARS procedure, NETL P 421.1-1, describes the process and procedural requirements for a safety analysis and review of on-site R&D projects. Its purpose is to ensure that risks associated with on-site R&D projects are analyzed, understood, and then eliminated, mitigated, or controlled to a degree acceptable by line management before work begins. All on-site R&D projects receive a SARS operating permit after successful completion of the review.

An annual review is conducted on all SARS-permitted R&D projects by a team made up of, at a minimum, the project's responsible person (or designee), an ES&H representative, a project quality assurance engineer, and the site's environmental manager. The assessment includes: (1) checking for significant modifications made to the project without appropriate authorization and SARS review; (2) ESS&H Division inspection of the project area covering chemical hygiene, OSHA requirements, and environmental compliance; (3) review of the SARS files and the project area for engineering design and QA/quality control concerns; and (4) review of problems found in the project area or in the SARS file. Records from each annual assessment are added to the project's SARS file.

Findings from the annual assessment are assigned a priority by the assessor or ES&H representative: Priority 1 findings are urgent actions that must be corrected within 7 days; priority 2 findings are serious deficiencies that must be corrected within 45 days; priority 3 findings are considered non-serious deficiencies and must be corrected within 120 days; and priority 4 findings are considered de minimis deficiencies that must be corrected within one year. After assignment, findings are sent to the responsible person for correction using AIIS. The responsible person's supervisor is copied on the finding.

NETL's Facility SARS Procedure (NETL P 421.1-3) covers on-site facilities including buildings, trailers, utilities, services, structures, roads, and walkways. Its purpose is to

ensure that facilities are constructed, maintained, and modified in compliance with applicable codes, regulations, and standards. The procedure provides for construction permits, which are required prior to new construction or modification of an existing facility, and for use permits, which are required prior to occupancy of a facility or changing the use of a facility.

An annual ES&H assessment is performed on all SARS-permitted facilities by an ES&H assessment team made up of, at a minimum, the facility's custodian and ES&H staff, including the OSHA safety manager, the chemical hygiene officer, the environmental manager, and the life-safety officer. Findings are assigned a priority based on significance and recorded in the AIIS database for tracking.

NETL's Support Operations SARS Procedure, NETL P 421.1-2, covers on-site support operations conducted by site support contractors. It includes construction, operations, maintenance, and renovation activities for which the site support contractors are responsible and ensures that associated risks are analyzed, understood, and then eliminated, mitigated, or controlled to a degree acceptable by responsible line management prior to initiation of the project or operation.

An annual assessment is conducted on all SARS-permitted support operations. The purpose of the annual assessment is to determine the continued validity of the SARS package and to address any changes in the operations. Typical items that might be re-evaluated include changes in site conditions, worker training, operating procedures, and the effectiveness of controls.

4.16 Performance Measurement

Goal setting is an excellent approach to motivate and monitor performance. NETL's environmental performance and progress toward goals is tracked and reported to satisfy both internal and external requirements. Throughout 2009, trained ES&H professionals performed extensive crosscutting audits and inspections of the NETL ES&H program to ensure adequate performance. The performance measures used to monitor progress include EMP Objectives and Targets (see Section 3.4) and institutional environmental performance measures. This includes NETL's performance measures established under the Government Performance and Results Act of 1993. These measures are tracked on a fiscal year basis. They cover performance goals and accomplishments for FY 2009. In addition to these measures, surveillance monitoring is conducted through routine reviews and inspections. The type of performance monitoring conducted through this program is presented in Table 4.16.1, Surveillance Monitoring – Pittsburgh and Morgantown.

MORGANTOWN

5.1 Site Description

The Morgantown site resides within Monongalia County, West Virginia, on the northern end of the city of Morgantown. This location is about 70 miles south of Pittsburgh, Pennsylvania, and about 200 miles west of Washington, DC. Geographically, the facility sits within the rolling hills of the Appalachian Plateau, about 1,000 feet east of the Monongahela River and about 10 miles west of Chestnut Ridge, the westernmost ridge of the Allegheny Mountains. The Morgantown site covers approximately 132 acres, 46 acres of which are developed as industrial. Two small streams border the site on the east and northeast sides, and all surface drainage goes into these two streams. Immediately surrounding the Morgantown site, the land use is a combination of residential, commercial, deciduous forest land, and pasture.

The Morgantown site focuses on technologies in coal utilization, natural gas production and utilization, and energy efficiency. This work is accomplished through both in-house R&D and contracted research. There are approximately 600 employees at the Morgantown site of whom roughly half are federal employees and half are site support contractors.

As of the 2000 U. S. Census, Morgantown's population consisted of 26,809 people, 10,782 households, and 4,183 families within the city limits. The population density was 1,056.2 people per square kilometer (2,736.0 people/mi²). There were 11,721 housing units at an average density of 461.8 units per square kilometer (1,196.2 units/mi²). The racial makeup of the city was 89.48 percent White, 4.15 percent African American, 4.15 percent Asian, 0.17 percent Native American, 0.05 percent Pacific Islander, 0.51 percent from other races, and 1.48 percent from two or more races.

The median income for a household in the city was $20,649, and the median income for a family was $44,622. Males had a median income of $33,268 versus $24,944 for females. The per capita income for the city was $14,459. About 15.0 percent of families and 38.4 percent of the population were below the poverty line, including 23.3 percent of those under age 18 and 8.3 percent of those who are age 65 or over. The major employers within the Morgantown area are West Virginia University (WVU), WVU Hospitals; Mylan Laboratories, Inc.; the Monongalia County Board of Education; the Monongalia Health System, Inc.; University Health Associates; the National Institute for Occupational Safety and Health; NETL; and the Health South Rehabilitation Hospital.

5.2 Major Site Activities

Facility Renovation

In 2009, several Morgantown facilities and several infrastructure areas underwent, or continued to undergo, renovation activities. These renovations not only improve the functionality of the building but also ensure that the infrastructure is in compliance with the most current revision of applicable codes and standards.

Building 26 – A design-build contract was awarded and design activities were completed for the renovation of office space on the second floor. Demolition of the existing offices, HVAC, and restroom facilities were underway before the end of the calendar year.

Building 2 – Area 10 was completely gutted and a design-build contract was awarded so that the space could be renovated and made available for in-house research activities. Design activities were not completed by the end of the calendar year however it was determined that the area would house a state-of-the-art computation science research and training program.

Building 17 – Facility infrastructure upgrades continued throughout the year on the ground floor in order to support the installation of an ARRA funded Appliance Testing and Evaluation Center. Several designs were completed to improve upon the HVAC and code-compliant electrical power distribution to the center.

Building 8A – An annex was added to Building 8 to house a new 100/700 PSIG compressed air system. The new compressors are being installed to replace the existing antiquated sitewide compressed air system. Installation of compressors and ancillary equipment continued throughout the year.

Building 12 – Infrastructure upgrades were completed on the facility in conjunction with the installation of the Extreme Drilling Lab. Renovations activities ensured that all utility distribution systems were upgraded and code compliant and that standard office and meeting spaces were provided for personnel use.

pH Building – Construction of a new pH facility (Figure H) was completed in 2009. This facility automatically adjusts the PH of the sitewide contaminated waste water effluent before it is released to the local utility board sewage system. The facility utilizes automated components to detect and adjust the PH of the effluent.

Figure H: Morgantown pH Building

Ethanol Refueling Station – Construction of an above ground holding and dispensing area for ethanol fuel was completed. This area allows NETL personnel to refuel General Services Administration (GSA) vehicles on site rather than utilizing local gas stations that may not have ethanol based fuels available for sale.

Roadways – Standard resurfacing of portions of roadways and replacement of sections of sidewalks continued throughout the year. This is part of an ongoing effort to ensure that deteriorating or damaged pedestrian pathways are replaced before they become a safety concern.

Facility Demolition

Minor demolition activities occurred in calendar year 2009. Facilities removal will continue into the future in an effort to reduce site footprint according to GSA requirements.

GPDU Project – Planning activities began for the removal of the Gas Process Development Unit (GPDU). This antiquated project includes multiple buildings that are no longer useful to the site or are in a state of disrepair. The safety analysis and review for the decommissioning and demolition of the project was initiated in 2009.

Utility Upgrades

Aging utility infrastructure and facility renovations/construction generated the need for partial or entire utility system upgrades.

Telecommunications – System studies were initiated in 2009 in an effort to map out the sitewide distribution of all information technology and communication utilities. Single line diagrams were created from this effort and will assist in determining the need for future upgrades and distribution methods.

Emergency Notification System – A design-build contract was awarded and design activities began on the required upgrade to the sitewide emergency notification system. The upgrade will bring the system into compliance with the most recent codes, standards, and regulatory requirements.

COMPLIANCE STATUS

6.1 Environmental Restoration and Waste Management

CERCLA

Morgantown had no National Priorities List (NPL) sites in 2009 and has never been proposed as an NPL site. Furthermore, NETL has never been on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list or the West Virginia Hazardous Waste Site list (state equivalent of CERCLIS). There were no reportable releases in 2009.

During the past 25 years, there have been several on-site cleanup activities. Some of these activities followed the closure of facilities that had leaked for a number of years. Other cleanup activities followed discrete spills. Table 6.1.1 provides an overview of these events in terms of the sources, the contaminants, and the current status of the sources and contaminants at the site. A list of the specific chemicals or materials of concern is presented in Table 6.1.2, Properties of Potential Contaminants.

SARA Title III

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires facilities that store hazardous materials in quantities exceeding specified threshold amounts to notify the state emergency response commission, cooperate in local emergency response planning activities, and submit hazardous material inventories to the local and state emergency response and planning organizations. It also requires reporting to the EPA and to designated state officials ~~of~~ any annual releases of toxic materials that are used, produced, or processed in quantities exceeding threshold amounts. The inventory requirement is triggered when the facility stores more than 10,000 pounds of a hazardous material (as defined by OSHA) or more than 500 pounds, 55 gallons, or the specific threshold planning quantity of a listed extremely hazardous substance.

To help comply with these regulatory requirements, NETL developed Procedure 440.1-2 (B), *Chemical Inventory and SARA Title III Reporting*, which is implemented by the NETL chemical hygiene officer. The program revolves around a computer-based chemical inventory system that is continually updated as materials are purchased, consumed, and disposed. The database is verified annually by representative samplings of work areas to determine whether observed types and quantities of materials match the database information.

Each chemical arriving on site must be accompanied by a Material Safety Data Sheet (MSDS) or it will be held at the warehouse until the MSDS is obtained. When a prospective buyer wants a particular chemical, they must first check the intranet-based chemical inventory and the waste accumulation list to determine if it is

available on-site. If not, they may complete a purchase request for the chemical. The purchase request is reviewed by a specialist who assigns an MSDS number to the requested material, if an MSDS is already on file. The specialist also attempts to determine if less hazardous substitutes are available. If the chemical is new to NETL, the Chemical Inventory and MSDS Manager (CIMM) will obtain a copy of the MSDS for review before it is approved to be purchased. Once the purchase request is approved, the purchase can be initiated. When chemicals arrive on-site, tracking begins. First, the chemicals are tagged and logged into the database. When the chemicals are moved to a new location, the database must be updated with the new location of the materials. When the empty container is picked up or when the remaining material is sent to the hazardous waste facility for disposal, the item is removed from the database.

Morgantown did not have any extremely hazardous substances above threshold planning quantities (TPQ) in 2009. NETL provides Tier 2 chemical inventory reports to the Monongalia County Local Emergency Planning Committee and the Morgantown Fire Department as a courtesy to these organizations and to document the actual quantities that remained on-site. Materials that are voluntarily reported in the Tier 2 report are carbon dioxide (average daily amount stored is approximately 3,500 pounds), hydrogen sulfide (average daily amount is approximately 850 pounds), hydrochloric acid (average daily amount is approximately 1,200 pounds), and liquid nitrogen (average daily amount stored is approximately 43,000 pounds). Nitrogen is stored outdoors in an above-ground storage tank and in individual gas cylinders.

Morgantown did not generate a toxic release inventory (TRI) in 2009 because the site did not release any of the listed toxic materials in quantities that exceed the TRI threshold amounts. Similarly, there were no releases that would trigger either EPCRA or CERCLA emergency notification.

RCRA

RCRA designates sites as generators, transporters, or treatment, storage, and disposal (TSD) facilities. Morgantown is regulated as a large-quantity generator and is under the jurisdiction of the WVDEP. Although hazardous waste generation rates are low for most months, occasional lab activities result in the generation of larger quantities that exceed the threshold for large quantity generators. See Table 6.1.3 for summary information on waste generation and management. NETL is not a licensed transporter or TSD facility for hazardous waste, nor does it hold a permit for treatment or disposal of non-hazardous waste that would be regulated under RCRA Subtitle D. Hazardous waste may be stored on-site for no more than 90 days without a permit. During 2009, hazardous waste materials were transported to the retreatment, storage, and disposal facilities of American Environmental Services (AES), Inc., located in Calvert City, Kentucky, for ultimate disposition in accordance with regulatory requirements. Non-hazardous waste (normal office wastes that are not recycled and cafeteria waste) and non-hazardous industrial waste is transported by Allied Waste to the Veolia E.S. Chestnut Valley L/F, Inc. landfill in McClellandtown, PA.

NETL complies with the RCRA manifest requirements by initiating documentation when hazardous wastes are shipped from the Morgantown site. The NETL hazardous waste coordinator initiates the documentation and files copies of the manifests, forms, waste profiles, and contracts. Ultimately, these documents are sent to the NETL ES&H Records Center.

NETL does not have an on-site program to treat hazardous waste or render them harmless; however, NETL does recycle some universal wastes as classified under RCRA. During 2009, NETL recycled batteries, fluorescent light bulbs, drums (Figure I), and various items containing mercury.

Figure I: Morgantown Drum Crusher

On-site hazardous waste handling is governed by NETL Procedure 450.1-9, RCRA Hazardous Waste Management. This procedure requires laboratory workers to place their hazardous waste into labeled containers (drums, buckets, bottles) in their labs. An internal manifest is used for tracking and identification. Laboratories have satellite accumulation areas where the waste awaits transport by technicians to the on-site collection area located in B-33. Technicians who transport the waste on-site inspect the waste for proper containment, labels, and completed documentation. They will not move waste that lacks these items. When unlabeled and unidentified

materials are found, NETL sends samples to a contracted laboratory to test for RCRA hazardous characteristics (e.g., toxicity, ignitability, reactivity, and corrosiveness).

According to the procedure, the collection occurs bi-monthly or as needed. At the collection area, a technician checks the containers for appropriate internal manifests, and the waste may be repackaged into lab-packs for purposes of transportation. Wastes are held only temporarily in the collection area until the next pickup by the contracted transporter. Storage on-site is less than 90 days for non-universal hazardous waste regulated by RCRA. The hazardous waste coordinator assures proper labeling on the waste at the time of pickup by the contracted transporter.

Despite training and the various administrative controls, including the planning that precedes the issuance of a SARS permit, the possibility exists that someone may dispose of hazardous materials down a sink, toilet, or floor drain. It is a violation of NETL procedures to put hazardous materials into sinks, toilets, floor drains, or regular garbage cans. During annual inspections and during periodic walkthrough inspections, ES&H staff members visually evaluate garbage cans for evidence of improper disposal practices. To check for improper flushing of chemicals, ES&H staff sample wastewater discharges monthly for metals, various organic compounds, pH, biological oxygen demand (BOD), total suspended solids (TSS), and total oxygen content (TOC). A full suite of chemical analyses are conducted annually on wastewater. If anomalous readings are obtained during the monitoring of the dedicated laboratory wastewater sewer system, troubleshooting begins. If necessary, ES&H staff will sample fixture traps and drains to locate the source of the chemicals. Spill kits are provided in areas where chemicals are handled. Floor drains are connected to the onsite pretreatment facility, where NETL staff may be able to detain and neutralize any spilled chemicals before release offsite.

Morgantown stores its waste indoors within a specially designated, secure area. Extra spill protection is provided by an epoxy coating on the concrete floor, which drains to fully contained sumps. The building is constructed with blast abatement and spill containment features to minimize the potential risks of spark-induced ignition and the spread of contaminants in the event of an explosion or leak. Each class of waste is stored in separate rooms to minimize the chance that a leaked material could come into contact with an incompatible substance and cause a reaction. An employee is assigned to perform daily inspections and keep records of the inspections. RCRA-required worker training is mandatory for all technicians who collect and handle hazardous waste. The initial training is supplemented periodically with refresher courses. All NETL employees take general awareness training. Those persons who generate hazardous waste in the labs take additional, lecture-based training.

There are no hazardous waste ponds or underground storage tanks for any materials at the Morgantown site. These items were phased out in the past, and most contaminated soils associated with these items were removed. Currently, aboveground storage tanks hold gasoline, diesel fuel, ethanol, and fuel oil. The tanks holding gasoline are visually inspected weekly for leaks. Quarterly interstitial monitoring is performed on the double-walled tanks. NETL installed most of these

tanks during the mid-1990s. Aboveground fuel tanks do not require certifications in West Virginia. At the Morgantown site, additional aboveground storage tanks are designed to hold acids and bases as lab feeds. The tanks designed for sodium hydroxide storage were never utilized and have been empty since installation. In 2005, the tanks designated to hold acids were thoroughly cleaned and prepared for decommissioning. The sump water (which consists of rainwater) collected in the secondary containment area associated with these tanks is discharged to the storm water drains.

To deal with the possibility of emergencies, the Morgantown site maintains an emergency response system, including a hazardous materials team. Several NETL directives specify the response to emergencies. If a spill occurs, the first person to notice the spill has the responsibility to report it immediately to site security. This will initiate an investigation and response that is proportional to the perceived potential threat or risk. NETL personnel who participate on the hazardous materials team or other response teams are trained to contain and control a spill or cleanup, as warranted. Emergency response drills are conducted annually. Where potentially needed, lab-specific operating procedures specify how to control and shut down various lab activities in the event of an emergency.

During 2009, hazardous waste management inspections continued to focus on proper control of hazardous materials within lab spaces. Any deficiencies were entered into the AIIS tracking system and appropriate actions were taken to correct these findings. The WV DEP Division of Water & Waste Management conducted an inspection during 2009. There were no deficiencies or findings.

6.2 TSCA

There were no unplanned releases of air pollutants covered by CERCLA or TRI regulations during 2009. Asbestiform fiber concentration air monitoring is conducted annually in Buildings 1, 2, 3, 4, 5, and 7, because asbestos-containing building materials were used in the construction of these facilities more than 30 years ago. No samples taken in 2009 contained fiber concentrations in excess of EPA and State of West Virginia clearance levels (0.01 fibers/cc). Occasionally, fiber concentrations do exceed that limit, but second level analysis has always verified that the excess was caused by non-asbestos fibers. The observed concentrations of asbestos fibers have always been below the clearance level.

6.3 FIFRA

There were no restricted-use pesticides, herbicides, or defoliants kept on-site during 2009. Only general use pesticides were kept and used for routine insect control. A professional pest control company is under contract to spray around the base of office trailers and for pest control in the cafeteria. Herbicides are not used for weed control except for extremely limited cases. No defoliants are used. The ES&H Division is not aware of any spills or releases of Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)-regulated substances (e.g., pesticides, herbicides, or defoliants).

6.4 Radiation Protection Program

NETL does not have an extensive program for protection of the public and the environment from radiation hazards, because its sources are all small, sealed instrumentation sources with low rem levels. NETL-Morgantown does not generate radioactive materialsand does not transport process, treat, store, or provide onsite disposal of radioactive waste. Sources are returned to the instrument manufacturers for disposal. For these reasons, the radiological program at the Morgantown site has been described within our regular ES&H (non-radiological) program information. Additional information may be found in Section 4.4 (Atomic Energy Act of 1954), and Section 4.3 (DOE Order 435.1, Radioactive Waste Management).
Non-applicable radiological program requirements for NETL include the following:

- Price-Anderson Amendments Act of 1988, as amended in 1992
- USC, Title 10, Part 71, Packaging & Transportation of Radioactive Material
- 10 CFR 834 (draft), Environmental Radiological Protection Program
- 40 CFR 61, Subpart H, National Emission Standards for Emissions of Radionuclide Other than Radon from DOE Facilities
- DOE Order 5400.5, Radiation Protection of the Public and the Environment
- DOE Order 435.1, Radioactive Waste Management

6.5 Air Quality and Protection Activities

The first of three environmental media protection programs is the Ambient Air Quality Program. Significant requirements and responsibilities of this program are listed in NETL Procedure 450.1-1, NETL Ambient Air Quality Management. Under this program, the air quality manager prepares permit applications, obtains permit renewals as needed, and oversees monitoring programs and reporting. Several EMPs have been created which focus attention on a few of the emissions categories or sources where NETL can make the most improvement. To maintain quality control in our program, NETL selects and subcontracts analytical work only to EPA-certified laboratories. These laboratories must submit their Quality Assurance/Quality Control (QA/QC) manuals to NETL for inspection, and the NETL site support subcontractors submit quality control samples (duplicates, blanks, and spikes) to the laboratories to verify the quality of the analyses. Where possible, air emissions monitoring systems onsite are checked or calibrated.

Two EMPs direct continuous improvement efforts in air-quality protection. One will eliminate use of Class I refrigerants by year 2010, to the extent economically practicable, and to the extent that safer alternatives are available. The second EMP is designed to reduce greenhouse gas emissions attributed to facility use through life-cycle cost effective measures by 30 percent by 2010, using 1990 as a baseline (67.4 million lbs). Additionally, two EMPs geared at reducing vehicular consumption of petroleum products and the emissions of air pollutants are in place.

The WVDEP generally evaluates air quality on a county basis, although the regional data may be aggregated into Air Quality Control Region (AQCR) #6, for north central West Virginia. Monitoring is performed in Morgantown on a daily basis at several sites, and these data are available from the WVDEP website's air-quality index and from the EPA AirNOW webpage. The Morgantown site is not a significant contributor to ambient air quality issues.

During 2009, there were no new source reviews (i.e., Clean Air Act pre-construction reviews) for any Morgantown facility, nor were there any Morgantown facilities with the potential to emit more than 100 tons/year of any designated air pollutant.

The Morgantown site is not regulated under the National Emission Standards for Hazardous Air Pollutants (NESHAP) program. Nor does the site emit more than 10 tons/year of any single designated toxic air pollutant or more than 25 tons/year in aggregate of all toxic air pollutants, which would otherwise qualify it as a major source requiring regulation under the Clean Air Act for listed toxic air pollutants. The Morgantown site does not perform nuclear program work and does not have radiological emissions, which would be covered by NESHAP.

6.6 Water Quality and Protection Activities

Surface water protection at Morgantown is controlled by NETL Procedure 450.1-3, *Surface Water Quality Management*, which is administered by the surface water quality manager (SWQM). Generally, this program includes spill prevention, hazardous waste control, and emergency actions, which are addressed specifically in other directives. The surface water program covers permits and monitoring for storm water sewers (which are separate from sanitary sewers) and for construction-related disturbances that potentially increase sediment loads in streams. The applicable directives are supplemented by more detailed instructions that are found in the Storm Water Pollution Prevention Plan, which documents the various potential sources of pollution and the prescribed methods for managing the various types of sources. Under the plan, designated storm water outfalls are sampled twice per year and tested for basic pollutants of concern that might indicate contamination from site applications of fertilizer or leaking sewer lines: see Table 6.6.1a NPDES Storm Water Monitoring Requirements. The results of that testing are presented in Table 6.6.1.b, NPDES Storm Water Analysis Results. If a spill were to occur, emergency response procedures would be activated immediately, and the appropriate outfalls would be monitored, as necessary, for the contaminants of concern. For all water protection

programs, quality control in sample analysis is maintained, in part, by choosing an analytical laboratory from a list of EPA-approved laboratories. QA/QC samples are submitted at least annually to further verify the quality of the analytical results.

On the developed portion of the Morgantown site, four drainage areas have rainwater runoff collection systems and regulated outfalls to the nearby surface streams.

1. Outfall 002 drains an area that holds the majority of the facilities for material handling and is approximately 509,652 square feet in area.

2. Outfall 003 receives drainage from a hillside beside B-17 and drains an area of 43,560 square feet. The permit does not require monitoring of this outfall.

3. Outfall 005 drains an area that includes Building 19 (warehouse, machine shop), Building 33 (hazardous materials temporary storage), and various research facilities. It drains an area of 209,088 square feet.

Figure J: Morgantown Outfall 101

4. Outfall 010, Figure J, drains parking areas, offices, and a large section of undeveloped land. It drains an area of 3,197,304 square feet.

The outfalls at the Morgantown site are monitored according to General Permit Registration #WVG610042 under National Pollutant Discharge Elimination System (NPDES) Permit #WV0111457. Potential sources of spills of petroleum products and oils are aboveground storage tanks, oil-filled transformers and switches, a hazardous waste accumulation facility, and 55-gallon drums stored at several locations (Buildings 5, 19, and 36). Six aboveground storage tanks contain petroleum products (diesel fuel and gasoline) and one contains ethanol, for a total capacity of 2,900 gallons. Three of the aboveground storage tanks are located inside the area drained by Outfall 002. Two additional aboveground storage tanks are located in the drainage area of Outfall 005, and the remaining two are in the drainage area of Outfall 010. The site has 25 oil-filled transformers and two oil-filled switches, all of which have been tested for polychlorinated biphenyls (PCBs). There are no buried or partially buried storage tanks at

Figure K: Morgantown Parking Lot Oil-Water Separator

the Morgantown site.

An oil-water separator, Figure K, is installed inside the runoff collection system of the new parking garage, but there are no other treatment systems for storm water at the Morgantown site. Based on previous test results, the primary concern with surface water impacts from the site has been sediment loading. Sediment loading of surface water runoff affects Burroughs Run along the southeastern margin of the site, West Run along the northeastern margin of the site, and a small stream that traverses the northern portion of the site and empties into West Run. The State of West Virginia has recently launched a program to categorize streams by water quality and to establish minimum water quality criteria for each category. It is anticipated that both West Run and Burroughs Run would be categorized as impaired streams that require the establishment of total maximum daily loading (TMDL) limits and further regulation. West Run is highly acidic from mine drainage located on the upper reaches of the drainage basin, and suburban development is increasing within the basin. Burroughs Run drains an area of significant urban and suburban development, which contributes typical urban/suburban pollution (e.g., oil, salt, pesticides, and herbicides).

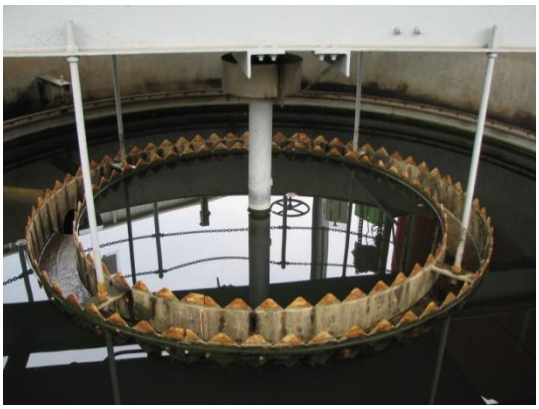


Figure L: Morgantown Clarifier

Although storm water runoff is handled by storm water sewer systems, a completely separate and dedicated sewer system handles the industrial wastewater. A third separate and dedicated sewer system on-site handles the domestic sewage. Industrial wastewater quality on-site is controlled by NETL Procedure 450.1-4, Industrial Wastewater Management, which is administered by the industrial wastewater quality manager. At the Morgantown site, industrial wastewater is that wastewater conveyed from laboratory sinks and laboratory facilities where pollutants other than normal domestic sewage might enter the wastewater stream. The industrial wastewater enters a clarifier, Figure L, located on-site, where the wastewater is sampled monthly. From the clarifier the industrial wastewater enters the on-site domestic sewage lines that empty into the municipal sewers owned and operated by the Morgantown Utility Board (MUB). The discharge is regulated under Pretreatment Permit Number MUB 012. Periodic sampling is performed, and the samples are analyzed by a laboratory chosen from a list certified by the EPA. Discharge monitoring reports (DMRs) detailing monthly sampling and analysis are provided to the MUB, and those reported in 2009 are provided in Table 6.6.1.c, NETL-Morgantown 2009 Wastewater Effluent Analysis.

The NETL monitoring activities help to enforce the requirement that hazardous wastes are not permitted in the laboratory drains or other drains, except in the trace

quantities that normally originate from washing laboratory equipment and glassware. Managers are required to provide suitable containers in laboratories for the collection If hazardous materials or petroleum products accidentally spill into the sewer system, NETL must follow the emergency response and notification procedures specified by the Spill Prevention and Control Management and the Comprehensive Emergency Management System directives (NETL P 450.1-5 and NETL O 151.1, *et seq*., respectively). Hazardous waste must be handled in accordance with NETL's directives on this subject. If pollutant concentrations repeatedly exceed permit limits, NETL will initiate surveillance of drains and fixtures that discharge into the industrial wastewater system to identify the source.

Protection of surface water and groundwater requires the prevention of leaks from storage tanks. Accordingly, NETL instituted a program under NETL Procedure 450.1-5, *Spill Prevention and Control Management*, which is under the oversight of the SWQM. As required by the NPDES storm water permit, this program mandates a written spill prevention, control, and countermeasures plan (SPCC) for each site and a written operations and maintenance plan for each individual storage tank system. Every system capable of contributing to fires, explosions, emissions, or spills of hazardous materials must have written operating plans that address precautions to prevent an emergency and actions to be taken during an emergency.

The program manager must identify potential spill sources onsite, establish visual inspection programs, generate lessons learned (and program improvements) from past spills, and coordinate the implementation of this procedure with the NETL emergency response activities. There have been no reportable spills of toxic or hazardous materials within the notification period (November 1996 to the present) of the current general storm water permit.

Aboveground storage tanks, such as Figure M., are visually inspected on a weekly basis and have their interstitial cavity checked quarterly. Visible leaks are corrected immediately. Oil-filled transformers and switches are visually inspected daily. If leaked materials are observed within secondary containment or on the surrounding ground surface, the material is collected or absorbed with spill kits.

Figure M: Ethanol Storage Tank

To the extent practicable, contaminated soil and rainwater are collected and disposed in accordance with regulations. Steel 55-gallon drums are stored in areas protected from rainwater and within a secondary containment. Large spill containment kits are used routinely as a means of secondary containment underneath the drums, and spill kits are kept nearby. The Hazardous Waste Accumulation Facility (Building 33) is designed and constructed to be compatible with the materials stored there and with the conditions of storage. Leaks within this facility will drain to sump areas that have manual sump pumps for collection of liquids. All of the storage area of Building 33

is inside, and the facility is inspected each week. Hazardous materials are not conveyed through underground pipes. All aboveground pipe valves are inspected when the associated tanks are inspected. All tank-filling operations must be attended constantly, and off-site personnel are accompanied by NETL personnel when they enter the site for refueling or loading operations.

Emergency containment actions would consist of placing absorbent materials at the source of the spill, at any potentially affected drains, and at the entrances and exits of culverts. Any contaminated materials collected following a spill would be disposed in accordance with applicable regulations. Spill kits of varying types are placed at numerous locations throughout the site. Personnel and equipment are committed and on standby to respond to spills, and emergency notification procedures are taught to the staff.

Morgantown has only one discharge to the municipal sewer system, which is regulated by the MUB (Permit MUB 012). MUB establishes the pretreatment requirements and the effluent standards. Annually, MUB inspects the pretreatment facility, plus the sewer connection. When the permit is renewed, MUB requests an update to the description of the industrial wastewater system and the sources of wastewater onsite. When the industrial wastewater system is modified or when there is a change in effluent composition, notification is required. MUB may elect to change the monitoring or pretreatment requirements in response to the changes made by NETL. MUB requires monthly sampling and analysis for the parameters listed in Table 6.6.1.c. They require that NETL annually sample and analyze for priority pollutants in accordance with the MUB permit, and MUB conducts an independent sampling and analysis to verify the results. Biological testing is neither required nor performed. MUB requires that the Morgantown pretreatment system have at least a settling clarifier and a pH control system. Industrial wastewater from the Morgantown site could contain chemicals from laboratories and projects, oil and grease from the motor pool maintenance area, or glycols (ethylene and propylene) from the chiller units (for air conditioning). History has shown that the primary concerns for discharges to the municipal sewer have been trace acids from research projects and alkaline boiler blow downs from the main boiler room.

In 2009, NETL improved the pH control system by building a pH control facility. It houses an equalization tank and two pH adjustment tanks. This allows for better control of the pH of the discharge water and will prevent future NOVs.

Also in 2009, NETL terminated the stormwater permit for the construction of B39. The WVDEP inspected the construction site and approved the termination. A separate stormwater permit was granted by the WVDEP for the construction of the day care facility.

6.7 Groundwater and Soil Quality Protection Activities

Groundwater protection onsite is administered through NETL Procedure 450.1-2, *Groundwater Quality Management*, which is managed by the groundwater quality manager. This is a program that covers regulatory requirements and best management practices for preventing leaks and spills, monitoring groundwater and soil, removing contaminated soil, and closeout actions. The directive is supplemented by more detailed information and instructions that are found in the Groundwater Protection Management Plan, which documents the site hydrogeology, various potential sources of pollution, potential contaminants that should be monitored, methods of well installation and sampling, a monitoring strategy, and QA/QC processes related to having water/soil samples analyzed by a contracted laboratory.

Maps of the site aquifers and wells are contained in the plan. Under the plan, selected monitoring wells are sampled and tested twice every year for general water quality parameters and for selected chemicals or metals that might indicate contamination from known leaks and spills. Should a spill occur, containment and cleanup would commence, and the affected soil would be monitored as necessary for the contaminants of concern. Highly contaminated soil would be removed, if practical. Alternatively, in-situ treatment would begin, unless the contamination levels were sufficiently low to warrant only monitoring. For all water protection programs, quality control in sample analysis is maintained, in part, by choosing an analytical laboratory from a list of EPA-certified laboratories. QA/QC samples are submitted at least annually to further verify the quality of the analytical results.

The primary strategy for groundwater protection is one of spill and leak prevention. Together, a Spill Prevention, Control, and Countermeasures (SPCC) Plan and a Storm Water Pollution Prevention Plan lay out the strategy for minimizing the risk of unintentional releases and quickly responding to an unintentional release in an effort to minimize environmental contamination. In addition to these efforts, the Morgantown site initiates new projects only after a rigorous ES&H review is conducted in accordance with the SARS directives. As part of the SARS process, the responsible person for each project must prepare a set of written procedures documenting how the project is to be operated, how waste and feed-stocks are to be safeguarded, and how to contain and control unintended releases. When a leak or spill does occur and the environment is threatened, the on-site emergency response team is activated, and the facility makes the appropriate internal and regulatory-driven notifications.

Figure N: Morgantown Monitoring Wells

Twenty active monitoring wells exist at the Morgantown site (see Figure N). The locations of the wells are displayed in Figure 6.7.1. These wells monitor two shallow aquifers within the unconsolidated Lake Monongahela sediments and one bedrock aquifer, the Morgantown Sandstone. None of these aquifers are used as a source of water in the immediate area.
Figure 6.7.2 shows a generalized cross-section through the site and the relationship between the aquifers.

No groundwater contaminants have ever been consistently detected at higher than regulatory levels at the site. Groundwater monitoring at the Morgantown site is focused primarily on past spills and leaks and the effectiveness of the cleanup actions undertaken. The section on CERCLA (Section 6.1.1) lists the past events and the current status of these spill sites.

An informal agreement exists between NETL and the WVDEP concerning the Pond 005 site located north of Building 7. The pond collected waste from an experimental fixed-bed gasifier. That site is now a parking lot. When the pond was closed and the area was converted into a parking lot during 1985, the closure was not consistent with the state-approved closure plan. Sampling indicated that low concentrations of SVOCs remained in the soil after removal of the pond liner. The plan called for removal of all the contaminated soil. But after removing many truckloads of soil, NETL decided to forego further removal despite the fact that some contaminated soil remained. NETL then constructed a parking lot on the site. The informal agreement subsequently reached with WVDEP requires groundwater monitoring around the parking lot perimeter. NETL continues to comply with this requirement. Five wells (I, J, L, M, and N) associated with the now-closed Pond 005 and completed in the Lake Monongahela sediments are sampled semiannually for benzene, toluene, ethyl benzene, xylenes, naphthalene, phenolics, cadmium, cyanide, sulfide, and sulfates. Three wells associated with closed Pond 005 (K, L, and N) have detected cadmium at levels above background. However, these have never consistently exceeded the West Virginia limit of 0.005 µg/l in groundwater. (See Figure 6.7.3)

During the construction of B-19, coal combustion ash was used as fill beneath the concrete floor slab. After completion of the building, leachate appeared which had the characteristics of acid mine drainage. Installation of collector drains at the footer of the building to collect the leachate and to convey it to a treatment facility that first raises the pH of the leachate into the alkaline range, filters the resulting precipitates from the leachate, and then adjusts the pH to the normal range was the mitigation method employed.

The only contaminants consistently found in significant amounts in the groundwater at the Morgantown site are those related to the application of salts for deicing purposes. Sodium chloride is applied to the parking lots and roads, and calcium chloride is applied to the sidewalks and outdoor steps. Wells located near these features and near the runoff routes from these features show significantly elevated

levels of chloride compared to background levels. (See Table 6.7.1, Table 6.7.2, Table 6.7.3, Table 6.7.4, Table 6.7.5, and Table 6.7.6)

This impact on groundwater is a problem that is shared with many businesses and road maintenance activities in this region, but it is considered a necessary safety practice to prevent injuries to site personnel and visitors.

The overall groundwater monitoring strategy has been to monitor any flow coming onto the site through each aquifer and to monitor the flow after it passes beneath the facilities and moves toward the springs and seeps. Groundwater monitoring at the Morgantown site from 1993 to 2002 was driven by two reasons. The first was the mandate of the WVDEP regarding the closure of Pond 005. The second was the mandate of DOE Order 5400.1, *General Environmental Protection Program*. Although DOE Order 5400.1 no longer exists, samples from a large number of wells were analyzed between 1993 and 2002 for a lengthy list of analytes. This list of analytes included all organic compounds known to have been detected in analyses of the coal tar waste from the aforementioned gasifier, the Pond 005 bottom sludge, and the sampled soils beneath Pond 005. It also included metals alleged to have been present in the Stretford solution used to remove sulfur oxides in the off-gas from the gasifier. No organic compounds were consistently detected during 10 years of sampling, and no consistent indications of contaminant concentrations above the state limits have been found. Only one analyte (cadmium), traceable to the operation of the closed pond, has been detected.

After more than 15 years of monitoring, groundwater conditions are well understood. Spills and leaks in the past have not significantly degraded the groundwater onsite. The facilities and most of the underlying contaminated soils associated with spills and leaks in the past have been removed. In recent years, operations have changed greatly, and there are now few large projects that could create significant groundwater contamination. At this point, most of the research is bench-scale and uses small quantities of chemicals and solvents. Accordingly, the groundwater analyses have been significantly curtailed. Under the new scheme, wells will be sampled each spring and fall. Wells located around the perimeter of the developed portion of the site in the two shallow aquifers will be tested to check water quality as it enters and leaves the developed area. For the deep aquifer, sampling will continue for one up-gradient well and three down-gradient wells. The original list of measurements and compounds analyzed, which was presented in the annual site environmental reports of previous years, has been reduced to the list presented in this year's report. The results of the groundwater monitoring conducted during 2009 are presented in the Appendix as Table 6.7.1, Table 6.7.2, Table 6.7.3, Table 6.7.4, Table 6.7.5, and Table 6.7.6.

PITTSBURGH

7.1 Site Description

The Pittsburgh site resides within Allegheny County, Pennsylvania, at a location locally known as the Bruceton Research Center. The site is approximately 13 miles south of Pittsburgh, Pennsylvania, in South Park Township. It is approximately 60 miles north of Morgantown, West Virginia. Geographically, the facility sits within the rolling hills and steeply incised stream valleys that are tributaries of the Monongahela River. The Pittsburgh site is a partially wooded tract with scattered industrial and office buildings. When the Pittsburgh site was first developed, the immediate vicinity was completely rural. However, the population and housing densities have increased dramatically in recent years.

Immediately west of the site is a low ridge top with a road and scattered houses. Another road with scattered houses borders the north side of the site. The east side of the site is bordered by Lick Run, the Pleasant Hills Sewage Treatment Plant, and a major local road. Housing development is increasing around the boundaries of the site, especially to the southwest, where new homes overlook the site. Commercial zones are found more than three quarters of a mile away, although some small businesses are located nearby. About 40 percent of the immediately surrounding land is forested and about 25 percent is pasture or fallow field. The remainder is residential.

With the decline of the steel industry and other manufacturing, the Pittsburgh area has shifted to retail trade and, more recently, to the service industry. The area is widely known for its hospitals and universities. However, Pittsburgh is still home to a number of large companies, such as the H.J. Heinz Corporation, PPG Industries, Bayer Corporation, Alcoa, and U.S. Steel. DOE employs about 510 people at the Pittsburgh site. NIOSH and MSHA employ an additional 502 people, so the entire workforce of the Bruceton Research Center is over 1,000. The laboratory is a major employer for the surrounding townships.

7.2 Major Site Activities

Facility Renovation

Numerous Pittsburgh facilities and general infrastructure areas underwent, or continued to undergo, renovation activities. These renovations not only improve the functionality of the building but also ensure that the infrastructure is in compliance with the most current revision of applicable codes and standards.

Building 83 – Renovations were completed on the third floor with the addition of research lab space and personnel offices. Demolition of second floor offices and lab space began in 2009 with an anticipated goal of providing

additional lab and personnel space by the close of 2010. Discussions were initiated with the on-site research group as planning began for the renovation of the first floor of the facility.

Building 86 – Major research components were removed from the building during later part of the 2009 calendar year leaving behind only major facility structural components and several support operation shops. The renovation design was initiated and several layout options were presented to the on-site research group for consideration. Once completed, the facility is expected to house the Pittsburgh machine shop and several other support operations including several personnel offices.

Modular Office Trailers – The design of underground utilities to support the installation of two leased modular office buildings on the Pittsburgh 900 Plateau was completed.

Building 167 – The design for a new roof and several upgrades to facility components associated with the exercise and emergency operations center were completed.

Building 94. Renovations to the computation science center housed on the first floor of the facility began in late 2009. The upgrade will increase electrical power and ventilation system capacity. Laboratory renovations to the fourth floor of the facility are ongoing.

Roadways – The contract for resurfacing of all major roadways and parking areas was signed in September of 2009. Due to the extensive nature of the asphalt replacement this construction activity is not expected to be completed until FY2012.

Facility Demolition

Minor demolition activities occurred in calendar year 2009. Facilities removal will continue into the future in an effort to reduce site footprint according to GSA requirements.

Building 900A – Due to the age and condition of the facility, it was decided to completely remove the facility and foundation. Included in the original plans was the removal of Building 900, Figure O, however after the facility was gutted it was decided that the remaining structure was in good shape and therefore the shell of the building remains. Future

Figure O: Building 900A

plans are being developed to turn Building 900A into office space.

Building 89 – Design efforts were initiated in 2009 to have the building and foundation removed.

Utility Upgrades

Aging utility infrastructure and facility renovations/construction generated the need for partial or entire utility system upgrades. Since many of the on-site roadways are scheduled for resurfacing in FY2010 there was a push to upgrade underground utility systems, where needed, that ran beneath new roadway surface.

Telecommunications – Fiber optic and various underground information technology communication infrastructure upgrades on the 920/900 plateau began. Much of installed service revolved around new feeds to the modular office complexes on the 900 plateau and Building 141.

Building 141 Electrical Feed. Repurposing of the facility from research to office space required an upgrade to switch gear and transformers. A contract was awarded to upgrade the feed to the building so that ownership and maintenance issues with NIOSH could be resolved. Under present conditions, NIOSH owns the feed.

COMPLIANCE STATUS

8.1 Environmental Restoration and Waste Management

CERCLA

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 (40 CFR 300-310; 43 CFR 11) requires federal facilities to comply with the provisions of CERCLA and imposes an additional set of regulations related to site studies and to notices for the sale and other transfers of federal real property. Specifically, this section makes all CERCLA guidelines, rules, regulations, and criteria applicable to federally owned or operated facilities, including: (1) preliminary assessments for facilities at which hazardous substances are located; (2) possible inclusion of such facilities on the NPL; and (3) remedial actions at these sites. Federal facilities are not required to comply with CERCLA provisions regarding financial responsibility and removal/remediation contracts with state governments. Federal facilities that are not on the NPL still may be subject to state laws concerning removal and remediation actions. However, these state laws and regulations may not impose provisions that are more stringent than those applicable to non-federal facilities. EPA administers the CERCLA program in cooperation with the Commonwealth of Pennsylvania for the Pittsburgh site. The CERCLIS database lists information

about the Pittsburgh site. The site was not listed as an NPL site during 2009 or at any other time in the past.

The Pittsburgh site is listed as undetermined on the EPA CERCLA Section 120 List. This is because NETL detected on-site soil and groundwater contamination prior to 1997 but has not been issued a further remedial action plan letter. Each year, including 2009, NETL provides a status report to the U.S. EPA through the DOE ES&H Program Office. The status report states the following:

> *The site sampling and analysis program has been completed. Remediation for areas of concern was completed during FY1997. Based on the sampling and analysis, no further significant soil remediation is planned. The human health and ecological risk assessment is in the process of being updated. The current conclusion is that exposure to media at the facility is not expected to generate adverse health effects in onsite or current receptors. Groundwater monitoring continued on a routine basis. EPA has been requested to perform a Docket Review and the Laboratory is waiting on the Docket Status Determination [which is "Undetermined"].*

SARA Title III

SARA Title III requires the reporting of hazardous chemicals that were present at a facility in excess of certain quantities during the preceding year. This includes gases and solid chemicals designated as extremely hazardous substances in amounts greater than or equal to 500 pounds, liquids in amounts greater than or equal to 55 gallons, or amounts greater than or equal to the threshold planning quantity (TPQ). It also requires reporting of all other hazardous chemicals present at the facility during the preceding calendar year in amounts equal to or greater than 10,000 pounds. Table 8.1.1 lists those chemicals reported by the Pittsburgh site for 2009, commonly known as the Tier II Chemical Inventory Reporting List. NETL maintains, through its Facility Tracking System (see Figure P), an active inventory of all hazardous and extremely hazardous chemicals onsite, along with an MSDS for each of these substances.

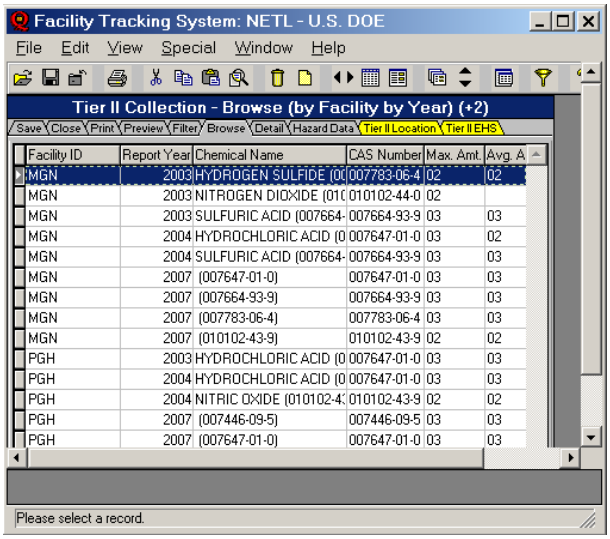


Figure P: NETL Facility Tracking System

The Pittsburgh site does not prepare a TRI (Form R) because the site does not use, produce, or process any of the listed toxic materials in quantities that exceed the threshold amounts. During 2009, there were no releases that would trigger emergency notification as required by either EPCRA or CERCLA.

Section 312 of SARA Title III requires NETL to provide an MSDS to the Pennsylvania Department of Labor and Industry, Bureau of PENNSAFE; the Allegheny County Department of Emergency Services; the South Park Local Emergency Planning Commission; the South Park Township Police; the Library Volunteer Fire Department; and the Broughton Volunteer Fire Department for each hazardous chemical and each extremely hazardous substance that was reported for the previous year. The Pennsylvania Emergency Response Commission, the local emergency planning commission, and the local fire departments have been advised of all materials and quantities and their locations on the Pittsburgh site.

As part of the on-going commitment to improve emergency planning under the SARA Title III Program, NETL has established targets for reducing the accumulation of hazardous chemicals onsite. The intent of these targets is to avoid the unnecessary accumulation of potentially hazardous chemicals in the laboratories while maintaining sufficient chemical stores to complete mission-related research.

RCRA

Hazardous waste operations at the Pittsburgh site (see Figure Q) complied with all applicable federal, state, and local regulations that apply to the handling, storage, and disposal of hazardous waste during 2009. RCRA (42 U.S. Code 6901 et seq.) is regulated through 40 CFR Parts 260-271, and the transportation of hazardous waste is regulated through 49 CFR Parts 171-179. The regulations found in 40 CFR 261, Identification and Listing of Hazardous Waste; 40 CFR 262, Standards Applicable to Generators of Hazardous Waste; and 49 CFR Parts 171-179, DOT Hazardous Materials regulations apply to the NETL hazardous waste program. NETL Procedure 435.1-1B (now P 450.1-9A), *Waste Handling, Storage and Disposal*, is used to implement these regulatory requirements.

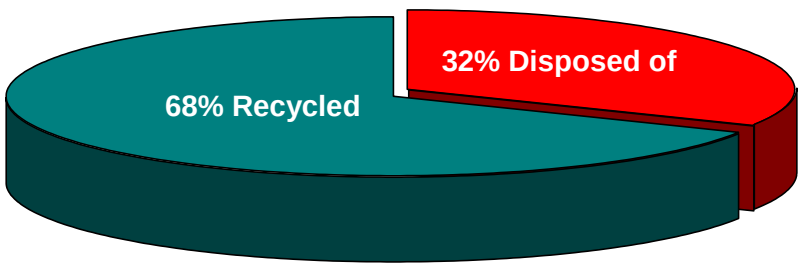


Figure Q: Pittsburgh FY209 RCRA Hazardous Waste Disposition Profile

The PADEP conducted a surprise inspection of the NETL-PGH's hazardous waste program on April 2, 2009. No violations were noted through the PADEP inspection report received by NETL-PGH. PADEP is authorized to enforce the federal and state hazardous waste management requirements at the Pittsburgh site. The hazardous waste operations personnel frequently review current waste industry newsletters and bulletins, receive information from the Alliance of Hazardous Materials Professionals, read NETL's regulatory compliance reviews, annually attend the hazardous waste operations training, and attend the hazardous materials transportation training every three years.

Pittsburgh is a large quantity generator and has an EPA Large Quantity Generator Identification Number. Although Pittsburgh generates relatively small amounts of hazardous waste during most months of the year, occasional lab activities result in the generation of larger quantities that exceed the threshold for small quantity generators. Hazardous waste is not retained onsite for more than 90 days because NETL does not have a permit to store non-universal hazardous waste for a longer period of time. Most waste is shipped in laboratory packs containing combinations of several different compatible chemicals within a single container (see Figure R).

The Pittsburgh site is not authorized to transport, and therefore does not transport, hazardous waste. All hazardous waste removed during 2009 was transported by American Environmental Services (AES), Inc., to its storage and treatment facilities. The AES facility combines small packages of similar waste and repackages the waste for more cost-effective shipment to a final disposal facility, Figure Q, which is selected by AES and monitored by NETL. Nonhazardous waste (normal office waste that is not being recycled and cafeteria waste) are transported to a local landfill using commercial waste disposal services.

Figure R: Packaging Hazardous Wastes

The amount of hazardous materials and waste removed from the site remained relatively the same as in previous years. Pittsburgh generated 6,720 pounds of hazardous waste during 2009. Pittsburgh also continues an aggressive program to reduce the chemical footprint. The latter was done by contacting various researchers to verify that chemical materials are still needed.

- Any items that were deemed unusable were disposed. See Section 3.4, Environmental Objectives and Targets, for an explanation of how this quantity was established. This reduction was accomplished using a multitude of efforts. For example, when unused and unopened chemicals were received for disposal, they were offered to other researchers for potential use. Less hazardous or nonhazardous chemicals were substituted for requested hazardous chemicals when possible. Batteries and fluorescent bulbs were sent to recyclers. Used computers were offered to schools or offered for sale as excess government property.

Liquid wastes are kept in drums. The Pittsburgh site does not have a storage or treatment pond, nor are there underground storage tanks in Pittsburgh for petroleum or hazardous waste. There are no aboveground storage tanks for hazardous waste. No leaks were reported from storage tanks during 2009. Liquid acids and bases are collected monthly at satellite accumulation areas and are analyzed for acidity.

Waste handling and management personnel ensure regulatory compliance by:

- Weekly walk-through inspections of the Chemical Handling Facility.
- Monthly pickups at satellite accumulation areas.
- Battery pickups at various locations.
- Participation in the SARS process.
- Participation in ERO exercises.
- Training on hazardous waste management.
- Regulatory reviews.
- Attendance at conferences addressing hazardous waste requirements.

Pittsburgh complies with the RCRA hazardous waste manifest requirements before wastes are shipped from the site. The NETL hazardous waste coordinator initiates the documentation and coordinates the completion of the manifest with AES, Inc., and the hazardous waste manager. When AES is ready to ship the waste, the manifest is again checked against the actual shipment to ensure accuracy. All information collected for the manifests, including waste generation forms, waste profiles, and contracts, is retained by the hazardous waste manager.

At Pittsburgh, hazardous waste generators have full responsibility for managing the waste that they generate from the moment of creation until it is transferred to the waste management organization. The waste generators ensure that all

hazardous or potentially hazardous wastes are properly contained and identified at the point of generation. Generators are held accountable for wastes that are not properly contained or identified or are otherwise mismanaged.

Figure S: Chemical Waste-Handling Techniques

Waste-handling personnel who collect the hazardous wastes first inspect the container, the labels, and the internal documentation to ensure that the wastes are properly packaged and labeled and that the required documentation is complete and accurate. The waste handling personnel are not allowed to accept or move any hazardous waste without proper packaging, labeling, and identification. The responsibility for identifying the waste rests primarily with the hazardous waste generator.

NETL's hazardous waste manager ensures compliance with applicable regulations by overseeing the entire hazardous waste program. Periodically, the hazardous waste manager reviews the program and brings any deficiencies to the attention of the appropriate individuals or managers and ensures the development, accuracy, and submission of the Biennial Hazardous Waste and Waste Minimization Reports to the Commonwealth of Pennsylvania. The hazardous waste manager also audits hazardous waste management operations, hazardous waste generators, and TSD facility subcontractors.

The manager signs the RCRA manifests and other relevant documentation (e.g., land disposal restriction (LDR) forms, waste profiles, and bills of lading) and maintains the original copy of the RCRA manifests, biennial reports, and certificates of disposal or destruction.

The manager ensures that training is provided to employees who require the annual hazardous waste operations and emergency response training (HAZWOPER) so that they may properly perform their duties and responsibilities. This includes instruction on the proper handling techniques and disposal methods for chemical waste, Figure R.

8.2 TSCA

No TSCA-regulated substances are manufactured by NETL-Pittsburgh and therefore is not subject to TSCA reporting requirements. Table 8.2.1 lists the TSCA-regulated chemicals held at Pittsburgh in quantities greater than 10 pounds. No PCBs are kept onsite for lab use or as a dielectric fluid inside electrical transformers. Oil-filled equipment is occasionally discovered onsite. Since it cannot be ascertained whether

it was manufactured after July 2, 1979, it is presumed to contain PCBs at a concentration greater than 50 parts per million.

Non-friable asbestos present at the NETL-Pittsburgh site is inventoried and maintained. Most is contained within floor tile and floor tile mastic installed on the floors of several lab buildings (e. g., Buildings 94, 141, and 903). The remainder is contained in roofs and in laboratory furniture (Buildings 83, 86, 94, and 921.) Asbestos remaining inside buildings is well encapsulated by the matrix material (e.g., floor tiles). Air monitoring has revealed no shedding of asbestos fibers. Asbestos is also found onsite in some gaskets and inside some lab devices, such as muffle and tube furnaces. Asbestos is removed as part of any remodeling or reworking job in a room, building, or facility where asbestos is present.

8.3 FIFRA

There were no restricted-use pesticides, herbicides, or defoliants kept or used onsite during 2009. Only general use herbicides were kept and used for routine vegetation control along fence lines, guard rails, and flower beds. This included Prosecutor Pro®. A commercial pest control company provided integrated pest management services in the cafeteria, in and around the daycare center, and around Buildings 95 and 903. Talstar® crystals are spread on the grass to control insects. Demand® is used in the cafeteria, at the daycare center on door thresholds and window sills, and outside Buildings 95 and 903 to prevent insects from entering the building. Additionally, diluted chlorine bleach is poured into all sinks and floor drains in the daycare center and cafeteria to act as a larvicide.

8.4 Radiation Protection Program

Use of radioactive materials at NETL-Pittsburgh is limited to research instrumentation, the 2009 source inventory is displayed in Table 8.4.1 and the 2009 x-ray radiation generating devices are listed in Table 8.4.2. NETL-Pittsburgh does not generate, process, or treat any radioactive material, and it does not have onsite any temporary or permanent facility for radioactive waste disposal. An inventory of radiation sources is actively maintained and monitored by the radiation safety officer. Information is retained about the item, isotope, quantity, custodian, location, status, and sealed source activity. All of the radioactive sources are sealed and are used in instrumentation. The site support contractor has the required NRC license for the three Ronan Engineering Company level density gauges. Pittsburgh has two sealed-source electron capture devices that are licensed through the manufacturer.

Radiation monitoring performed at Pittsburgh consisted of body thermoluminescent dosimeters (TLD) and finger rings for the employees in the mail facility. In addition, specific radiological control areas have dosimeter badges continually displayed. No radiation leakage or exposure problems occurred during 2009.

8.5 Air Quality and Protection Activities

The NETL Ambient Air Quality Management Program is concerned with protection of outdoor air quality. This includes the applications for air emission permits that allow NETL to conduct research into the science of reducing air emissions. The program is regulated by ACHD, which is authorized to administer Title V permits under the Clean Air Act Amendments.

The air quality manager prepares permit applications, obtains permit renewals as needed, and oversees monitoring programs and reporting. Air emissions are reported annually in accordance with the three air permits maintained at the site. On January 5, 2009, the site was issued a Title V permit designating NETL Pittsburgh a synthetic minor source. The permit expiration date is January 4, 2014.

A synthetic minor is any source that has its emissions administratively limited below certain thresholds by means of a federally enforceable order, rule, or permit condition.

Several regulatory requirements are outlined in the permit that must be followed. Specifically, an emissions inventory in accordance with §2108.01.e shall be submitted to the Department by March 15 of each year for the preceding calendar year.

The model used by the ACHD, Bureau of Environmental Quality, Division of Air Quality, to calculate the emissions inventory is based on fuel usage and provides a worst-case potential to emit emissions. This model takes into account the type, quantity, and total burn time of the fuel to determine the estimated emission level. The results of this modeling are summarized in Table 8.5.1. Additionally NETL must submit semiannual reports to the Department in accordance with General Condition III.15.d. The semiannual report includes pilot-scale boiler B-003, comfort heat boilers B-004 thru B-009, and emergency generators EG-001 thru EG-003.

There were no NOVs and no unplanned air emissions during 2009.

NETL actively participates in a program for a reduction in the use of Class I ozone-depleting substances (ODS). This program aims to recover and reclaim chlorofluorocarbon refrigerants from HVAC equipment for subsequent reuse. The inventory of ODS-containing equipment onsite is steadily decreasing. Older ODS-containing equipment is being replaced, and the use of Class I ODS is being phased out for the HVAC equipment. For example, water fountains that contained Class I ODS in their chiller units continued to be replaced across the site during 2009. Systems and appliances with environmentally friendly substitutes are being used to replace the Class I ODS-containing systems and appliances.

Figure T: Pittsburgh Rain Gauge

The site maintains three 30-foot meteorological towers that monitor temperature, relative humidity, precipitation, wind speed, and wind direction. The towers are not used for emissions monitoring. Data are collected twice per week for use by the site's HVAC programs to provide critical meteorological information to the ERO during emergency situations and provide meteorological information used in the models for the air emissions program. A rain gauge, Figure T, monitors rain fall at the site.

8.6 Water Quality and Protection Activities

The topography of the Pittsburgh site is composed of rolling hills that separate the natural flow of water on the site. Consequently, the surface water quality and protection program is essentially divided into two distinct areas. One area is located north of Experimental Drive, and the other area is located south of Wallace Road. The northern area houses all of the laboratory and process facilities for the DOE portion of the site, and the southern area primarily houses administrative, project management, and contractor maintenance operations.

The site is staffed by ES&H professionals who review activities to ensure that the site does not contaminate storm water, industrial wastewater, or sanitary wastewater discharges. All on-site research projects and support activities are reviewed by ES&H staff as part of the SARS process for possible impacts on air, surface water, groundwater, and soil. Applicable federal, state, and local regulations potentially affecting these activities are reviewed, and compliance is ensured before approval to operate is given by the ES&H staff.

Laboratory wastewater from the northern area is routed to the wastewater treatment facility (WWTF) located in Building 74. All treated industrial wastewater, which consists of laboratory and process wastewater from the site's R&D operations, is regulated by the Pleasant Hills Industrial Sewer Use Permit Program. Treatment in the WWTF consists of flow equalization, with subsequent pH adjustment by adding caustic soda or ferric chloride.

Figure U: Pittsburgh WWTF Absorbers

Metals and particulates are removed by agglomeration in the flocculation tank, coupled with solids separation in the plate separator, and final removal of the metals and particulates occurs in the filter press. An activated clay/activated carbon filtration system, Figure U, provides additional removal of organics and metals from the treated wastewater prior to discharge into the sanitary sewer.

The effluent can be recirculated from within the effluent monitoring tank immediately prior to discharge to the sanitary sewer. This recirculation is pH-driven. If the pH is outside the allowable range (between 6 and 9), a diverter valve automatically opens, which allows the off-specification treated effluent to be recirculated within the system for additional treatment until the pH again meets requirements. Final effluent pH adjustment occurs in a chamber inside the effluent monitoring tank prior to discharge into the sanitary sewer system. Treated industrial wastewater effluent from the site's WWTF is then routed to, and given final treatment in, the Pleasant Hills Sewage Treatment Plant.

The PHA issued the current Industrial Sewer Use Permit to NETL on October 14, 2009. Conditions placed on NETL by the permit limit the quantity and quality of effluent constituents (total cyanide, mercury, copper, lead, and pH) that may be discharged into the wastewater. The permit requires NETL to submit all wastewater analysis data for the treated wastewater effluent discharged through the WWTF to PHA's consulting engineering firm, Gannett Fleming, Inc., on a semi-annual basis. Table 8.6.1 contains the results of the 2009 monitoring. During this semi-annual sampling, PHA independently conducts sampling and analysis. NETL also provides the PHA with the monthly sampling analysis at their request, although these data are not required by the permit.

In addition, NETL is required to prepare an annual wastewater report that contains no analytical data, but rather summarizes information about the site's industrial waste water discharge, including the volume of wastewater discharged, the number of site employees, the type of waste discharged, and the type of pretreatment performed.

Table 8.6.2 provides the industrial WWTF effluent sampling results taken at the WWTF during 2009. The permit limits were exceeded for chloroform in February 2009 and an NOV was received although the level of chloroform was higher in the background drinking water samples than in the effluent sample.

The southern area of the site does not have and does not need an industrial wastewater sewer system separate from the sanitary sewer system that drains to the Clairton Municipal Sewage Treatment Plant, because there are no laboratory operations on the southern area of the site.

Pittsburgh's sanitary sewage from the northern area is combined with sanitary sewage from the other major federal agency on the site, CDC/NIOSH. This sanitary sewage discharge is separate from the discharge of the treated laboratory/process wastewater.

In addition to the sampling and analysis performed by NETL and CDC/NIOSH, PHA conducts independent sampling and analysis of wastewater effluent from all these

locations. This information is used by the PHA to determine whether any discharges of the treated effluent were in excess of the local limits and required the issuance of an NOV.

The Mine Safety and Health Administration (MSHA) is the other federal agency sharing the environment of the Bruceton Research Center. MSHA is also located on the northern area, but has a separate sanitary sewer line from the NETL/NIOSH sub-interceptor discharge that is positioned on the north side of the site. The MSHA sanitary sewer line discharges directly into the South Park (PA) main sanitary line. The NETL/NIOSH sub-interceptor sanitary sewer line also discharges into the South Park main sanitary line, but at a point much closer to the PHA WWTF.

All NETL sanitary sewage from the southern area is routed to, and treated in, the Clairton Municipal Sewage Treatment Plant.

Storm water (surface water) runoff from the 69-acre NETL northern portion of the site exits the site through the northern storm drainage system, a dedicated storm water system that drains directly into nearby Lick Run. This discharge occurs at the NPDES-permitted North Outfall (001). Lick Run is a small natural stream that flows along the eastern boundary of the 238-acre Bruceton Research Center.

Contaminants to the storm water effluent (such as the salt storage facility, Figure V) are regulated by an NPDES storm water discharge permit. The contaminants consist of air-conditioning condensate, runoff from various impervious surfaces into the site storm sewers, and treated acid-mine drainage from a research coal mine operated by CDC/NIOSH. One reportable release into this permitted system during the year required NETL to notify PADEP. The release involved a maintenance activity on September 9, 2009, that released turbid water into Lick Run.

Storm water collected from the southern side of the site exits through the southern storm drainage system, a dedicated storm water system that enters Lick Run through the NETL NPDES-permitted South Outfall (002). NETL is required to monitor and report the results for the two site storm water discharge outfalls on a quarterly basis, although there are no discharge limits established for this discharge.

Figure V: Pittsburgh Salt Storage Facility

An NPDES storm water discharge permit issued to the Bruceton Research Center lists three outfalls: North Outfall

(001), South Outfall (002), and North Outfall Extension (101).

The North Outfall Extension discharges directly into the North Outfall. The North Outfall receives storm water from NETL, NIOSH, and MSHA. The South Outfall receives storm water from NETL and NIOSH. The North Outfall Extension receives treated acid mine drainage from the NIOSH mine before it is discharged to the North Outfall.

Storm water discharged from the northern side of the site is regulated through an NPDES permit issued to NETL, NIOSH, and MSHA. Storm water discharged from the southern side of the site is regulated through an NPDES permit issued only to NETL. Table 8.6.3 provides the storm water North Outfall monitoring results for flow, suspended solids, carbonaceous biochemical oxygen demand 5-day test (CBOD5), oil and grease, aluminum, iron, manganese, lead, mercury, pH, and ammonia. Table 8.6.3 also provides the storm water South Outfall monitoring results for flow, suspended solids, aluminum, iron, manganese, lead, pH, and ammonia.

8.7 Groundwater and Soil Quality Protection Activities

The Pittsburgh site (see Figure 8.7.1) is located within the Appalachian Plateau physiographic province. The topography, consisting of rolling hills and ridges, reflects the dendritic drainage erosion of the uplifted Allegheny Peneplain.

All rocks in the area are of sedimentary origin. They are almost exclusively of Pennsylvanian or Permian Age, with the exception of alluvium in the stream and river valleys, which is of Quaternary Age. At the Bruceton location, bedrock is of Pennsylvanian Age and belongs to the Monongahela and Conemaugh Groups. The contact is identified by the Pittsburgh Coal, which is the basal member of the Monongahela Group (see Figure 8.7.2).

The Monongahela Group forms the tops of the hills on the site and consists of cyclic and inter-fingering sequences of shale, limestone, sandstone, and coal. Two prominent coal beds, the Redstone Coal and the Pittsburgh Coal, outcrop onsite. The Pittsburgh Coal, however, has been heavily mined and very little remains. The resultant mine voids and their possible effect on groundwater are subsequently discussed.

The Conemaugh Group is exposed lower on the hills and in the valleys of the site. The upper member of this group is the Casselman Formation and consists of thinly bedded limestone inter-bedded with calcareous, variegated shale, and sandstone.

In the Pittsburgh geologic quadrangle, there are two major anticlines and two major synclines. The axis of one of the anticlines, the Amity Anticline, trends northeast to southwest and passes just southeast of NETL. As a result, rock units under the site dip gently to the northwest at about a 10° angle. Locally, minor folding and faulting also occur.

Groundwater in the region is known to occur in unconsolidated deposits in stream valleys and in fractures, spaces between pores, bedding planes, and solution channels in consolidated rock layers. No water-bearing zones have been encountered in overburden soils during previous drilling on NETL property.

The shallowest aquifer on NETL property is found in the weathered bedrock just below the rock/soil contact and occurs over most of the site, except where it is undermined. Recharge of this unit occurs where rainfall percolates downward into the weathered strata until a continuous horizon of low vertical permeability (unweathered bedrock) is encountered. There are a total of 19 wells screened in shallow weathered bedrock; 7 are located in the R&D Plateau area and 12 are in the Valley Fill area. Figure 8.7.3 and Figure 8.7.4 show the locations of the monitoring wells.

A deeper, water-bearing zone has been noted at the contact between the Connellsville Sandstone and the Clarksburg Clay and Limestone. There are a total of 4 wells screened in this deeper zone (located in the Main Plateau area). This deeper aquifer had extremely low yield in the Valley Fill area.

Four wells (2 at the Main Plateau and 2 in the Valley Fill area) were originally screened in the depth interval between the two aquifers, within fractured strata. These wells had extremely low yields and were subsequently abandoned. The minimal amount of groundwater occurring in this intermediate zone is probably the result of leakage from the overlying shallow, weathered bedrock zone.

The Pittsburgh Limestone, with its inter-bedded shales, is generally impermeable except where weathered or fractured or where bedding plane separations have been formed by solution. On-site monitoring wells installed in the Pittsburgh Limestone formation have had highly variable water production. Weathered or fractured portions of this unit have been capable of supporting submersible pumps, and a spring emanating from a limestone outcrop in the bed of McElhaney Creek flows freely and constantly year round. Conversely, where the unit is unweathered or exhibits poorly developed fracture zones, yields have been very poor.

Although the Connellsville Sandstone has been reported to yield up to 25 gallons per minute in some southern portions of Allegheny County, previous on-site drilling into the upper Connellsville revealed it to be shale and relatively unproductive. However, the lower Connellsville at the contact with the Clarksburg group was highly fractured, and at some locations it exhibited water-filled voids.

The Lick Run Valley, which borders the eastern edge of the Pittsburgh site, is made up of silt and sand alluvial deposits. The alluvial deposits comprise a water-bearing unit, which discharges to form the stream base flow within Lick Run. Although shallow piezometers have been established in these deposits, the thickness of this water-bearing unit is unknown.

The vast majority of domestic water supplies for the area surrounding the Pittsburgh site are provided by the Pennsylvania American Water Company, which processes water from the Monongahela River. There was, however, at least one groundwater well listed for domestic usage within a one-mile radius of the site. This well, situated near central Bruceton, was 140 feet deep and was completed in the Monongahela Group, according to the computerized PADEP Water Well Inventory. Upon topographic review of the well's location based on reported longitude and latitude, it was possible that this well, was in fact, completed in the Conemaugh Group, due to the reported depth of the well. The well is located to the north of the Pittsburgh site, so it should not be affected by NETL groundwater impacts, because groundwater is assumed to flow in a southerly direction beneath the Lick Run Valley. There has been a report of a domestic water well on Piney Fork Road (approximately 1-1/2 miles south of the Pittsburgh site), but this well could not be located or confirmed by preliminary physical exploration and was not included on the water well inventory.

The PADEP Water Well Inventory reported no other domestic wells in Jefferson Borough or South Park Township. It should be noted, however, that the inventory does not list those wells that may have been drilled prior to 1966.

There are two groundwater flow patterns at the Pittsburgh site. Groundwater flowing in the shallow, weathered bedrock aquifer may percolate along the soil/bedrock interface and/or along near-vertical stress relief fractures and follows the general site topography, flowing from the tops of hills on the site and generally perpendicular to ground surface elevation contours. This flow is directed by the intervening valleys toward the Lick Run Valley, where it joins the water-bearing unit located in the valley and adds to the base flow of Lick Run itself, Figure X. Some of this flow also discharges as springs on the hillsides or in the valleys.

Figure X: Lick Run

The second flow pattern is associated with the deeper aquifer. Groundwater in this zone generally flows east towards the Lick Run Valley, where it commingles with water of the shallow zone as it flows off the hillsides.

The Pittsburgh Coal seam outcrops throughout the Pittsburgh site and underlies a small portion of NETL property, particularly the Building 167 area. The coal outcrop can be seen in the hillside above the main plateau area. The 900 and 920 areas are built on fill very near to where the coal probably outcropped, but the seam probably has been removed by crop mining or stripping during construction.

The Pittsburgh Coal has been extensively mined since the beginning of the 20th

century and is mined out in the area, except for remaining roof support pillars and a small working portion of the NIOSH-owned experimental mine. The coal seam, as with the other strata, dips to the northwest at an approximate 10° angle. Near the eastern boundaries of the site, the top of the coal is located at an elevation ranging from 1,015 to 1,020 feet above mean sea level. The dip is such that the top of the coal is found near 990 feet above mean sea level at the western end of the site.

The coal seam and associated mine workings have influence on groundwater at those locations underlain by them. Fracturing of overlying strata and actual roof collapse has created conduits that act to dewater the overlying rock. This is the case at Building 167 (and the adjacent triangle parking lot) where the shallow, weathered bedrock zone was dry. Also, the voids created during mining leave open conduits that allow water to flow down freely, possibly exiting at old portals. Mining may have removed underlying fireclays usually associated with the bottom of coal seams, opening up the possibility for downward migration of water into the underlying rock.

The Groundwater Monitoring Program (GMP) has as its primary objective the monitoring of the shallow, weathered bedrock zone as the first significant aquifer or water-bearing unit beneath the Pittsburgh facilities of NETL. Contamination entering the ground from soil surface sources would be expected to impact this zone first and foremost; hence, the majority of wells are placed in this zone. The GMP also monitors the wells screened in the deeper water-bearing zone in order to provide data on water quality and contaminant migration.

Another goal of the monitoring program is to identify and characterize groundwater flow and relate it to surface water flow conditions to better evaluate potential environmental effects of any groundwater contamination.

By properly characterizing local groundwater conditions, it is possible to ensure that potential contamination and potential contaminant migration routes have been suitably identified and investigated. This enables the groundwater program manager to be cognizant of potential continuing contamination and to remediate these contamination sources if warranted.

The 2009 groundwater monitoring (Figure Y) was performed according to the NETL-PGH 2009 Groundwater Detection Monitoring Plan. NETL-PGH monitoring well locations are identified in Attachment A of this plan. To fulfill a PADEP storage tank closure request, eight wells were monitored for total petroleum hydrocarbons (TPH), diesel range organics, in 2009. The results of the NETL-PGH Groundwater Detection Monitoring Program are presented in

Figure Y: Pittsburgh Groundwater Monitoring

Tables 8.7.1–8.7.8. The results were compared against federal and state standards for groundwater.

The following is a summary of the results:

- Well VFW-3 exceeded the state drinking water primary MCL and the EPA Region III risk based tables for tetrachloroethene. Well VFW-3 is located adjacent to a laboratory wastewater holding tank, which the overflow was connected to a french drain. The overflow was connected to the sanitary sewer more than 20 years ago.

- Iron, manganese, chloride, and total dissolved solids exceeded standards for six (state drinking water secondary MCL and Act 2 secondary MCL), 14 (state drinking water secondary MCL, Act 2 secondary MCL, and EPA Region III risk based tables), 15 (state drinking water secondary MCL and Act 2 secondary MCL), and 19 (state drinking water secondary MCL) wells, respectively. This has been contributed to past mining activities.

- Wells MPW-10 and MPW-2 exceeded state drinking water secondary MCL standards for pH. These wells are installed in limestone bedrock.

Statistical analysis was conducted on the indicators of groundwater contamination [pH, specific conductance, total organic carbon (TOC), and total organic halogens (TOX)] of 21 NETL-PGH Groundwater Monitoring Wells on the 2009 monitoring data. The analysis compared the up-gradient wells to the down-gradient wells. The up-gradient wells are VFW-2 and VFW-10. The results of the statistical analysis for pH showed that for the tolerance interval-two tailed method, Wells MPW-4D, MPW-9, MPW-10, VFW-1, and VFW-6 were outside of the background tolerance intervals. The results of the statistical analysis for specific conductance showed that the tolerance interval-two tailed method for Wells VFW-2 and VFW-7 were outside the background tolerance limit. The results of the statistical analysis for TOC showed that, for the tolerance interval-two tailed method, no wells were outside the background tolerance intervals. The results of the statistical analysis for TOX showed that no significant change for the Wilcoxon Rank-Sum Test for Two Groups for all wells.

Monthly groundwater elevation measurements to determine contaminant transport were completed in accordance with the Groundwater Protection Management Program. The elevations are consistent with the general groundwater flow patterns described previously.

Figure Z: Pittsburgh Piezometers

An element of the Groundwater Protection Program is the surface water - groundwater interaction. A piezometer was monitored monthly in 2009 along Lick Run upstream of the site, and a piezometer was monitored weekly along Lick Run adjacent to the site to determine if Lick Run is a gaining or losing stream, Figure Z. A gaining stream has groundwater flowing to the stream, while a losing stream has surface water flowing to the groundwater.

The data collected indicates that Lick Run upstream of the site is a gaining stream for 10 out of the 12 months, while Lick Run adjacent to the site is always a gaining stream.

ALBANY

9.1 Site Description

The Albany site resides in Albany, Oregon, which is located in both Benton and Linn Counties in the western part of the state, Figure AA. It is the county seat of Linn County. It is approximately 45 miles north of Eugene, 69 miles south of Portland, and 24 miles south of Salem.

Figure AA: Albany Site

Geographically, the facility is located in the Williamette Lowland, which is a structural and erosional lowland between the uplifted marine rocks of the Coast Range and the volcanic rocks of the Cascade Range. The Albany site covers approximately 42 acres and approximately 220,000 square feet of working area. The site is relatively flat, located on a higher section of town, away from any flood plains. The Calapoonia River is located west of the laboratory, flowing in a broad arcuate pattern from southeast of the laboratory, around the laboratory on the west to north of the laboratory, where it flows into the Williamette River. Immediately surrounding the Albany site, the land use is a combination of residential housing developments, small businesses, and public school properties.

The Albany site, formerly known as the Albany Research Center, is a materials research laboratory. The research addresses fundamental mechanisms and processes; melting, casting, and fabrication of materials (up to one ton); characterization of chemical and physical properties of materials; and dealing with the waste and byproducts of materials processes.

As of the 2000 census, there were 40,852 people, 16,108 households, and 10,808 families residing in the city. The population density was 2,571.8/sq mi. There were 17,374 housing units at an average density of 1,093.8/sq mi. The racial makeup of the city was 91.68 percent White, 6.09 percent Hispanic or Latino of any race, 1.22 percent Native American, 1.14 percent Asian, 0.53 percent African American, 0.21 percent Pacific Islander, 2.65 percent from other races, and 2.56 percent from two or more races.

The median income for a household in the city was $39,409, and the median income for a family was $46,094. Males had a median income of $36,457 versus $24,480 for females. The per capita income for the city was $18,570. About 9.3 percent of families and 11.6 percent of the population were below the poverty line; including 14.1 percent of those under age 18, and 7.5 percent of those age 65 or over. The major employers in Albany are Samaritan Health Services; Allvac-Oremet-Wah Chang Metals; Linn Benton Community College; Greater Albany Public Schools; Linn County; and Weyerhaeuser Company.

9.2 Major Site Activities

Facility Repairs Completed

The roofs on Building 28, 33 (Figure BB), and 39 were entirely replaced in 2009 in response to concerns expressed by the building occupants regarding their overall health and safety. The new roofs provide improved ultraviolet sunlight protection and insulation, ensuring increased energy efficiency in the buildings.

Figure BB: Building 33 Roof

Abatement Completed

In 2009, asbestos abatement was completed in a number of critical areas in Buildings 1, 13, 17, 24, 28, 30, and 35. In addition, mold abatement was completed in several areas in Buildings 13 and 28. Both were performed to ensure that employees are not exposed to asbestos or mold.

Facility Projects Completed

Various facility projects were completed in 2009. These projects included a major office renovation in Building 17; emergency lighting upgrades in Buildings 17, 31, and 39; electrical infrastructure and panel upgrades in critical support areas in support of sitewide beryllium remediation activities in Buildings 1, 4, 21, 28, 30, and 31; and the disconnection of power and utilities to support the demolition of Building 3. These projects were performed to increase personnel safety, meet facilities needs, and increase energy efficiency.

Ventilation/IAQ

In 2009, additional heating/cooling capacity was installed in Building 17 office areas. This work was performed to ensure that employees are working in an atmosphere that has acceptable Indoor Air Quality (IAQ).\

COMPLIANCE STATUS

10.1 Environmental Restoration and Waste Management

CERCLA

The Albany site had no off-site remediation activities that were ongoing during 2009, and there were no NPL sites for which they had liability under CERCLA/SARA.

SARA Title III

The Albany site does not use, produce, process, or store hazardous materials in excess of threshold quantities that would trigger EPCRA reporting. Therefore, TRI reporting (Sec. 313) is not necessary. However, emergency response planning has been implemented at the site. A chemical inventory and MSDS database are maintained to aid in the efficient use and storage of chemicals and for worker safety and knowledge.

There were no on-site CERCLA/SARA cleanups at the Albany site in 2009. There were no releases that would trigger reporting to DOE Headquarters Emergency Operations Center, the U.S. Coast Guard National Response Center, or any other governmental agency.

RCRA

In 2009, there were no spills or leaks from facilities, operations, or other activities that would lead to RCRA cleanups. Also, no cleanups or surveillance activities for leaks or spills occurred in prior years.

10.2 NEPA

Project managers complete questionnaires regarding the potential for environmental impacts associated with project proposals that are under consideration for funding or financial support. In 2009, all funded projects at the Albany site were determined to be categorically excluded.

10.3 TSCA

Albany did not have any spills or releases of TSCA-regulated substances (e.g., pesticides, PCBs, formaldehyde, methylene chloride, asbestos) in 2009.

10.4 Rdiation Protection Program

Ionizing Radiation Program

There are only x-ray generating devices used for analytical applications at the Albany site. These include scanning and transmission electron microscopes, x-ray diffraction and fluorescence instruments, and a particle size analyzer. Table 10.4.1 lists the x-ray radiation generating devices at Albany. All are examined annually for leaks and safety controls to insure employee safety. A dosimetry program has been in place since the 1950s to check for employee exposures. No sealed sources are located at the site. No new radioactive materials are brought to the site, however, a few legacy items remain stored in an area identified as a hot cell while awaiting disposal.

Laser Program

The Albany office uses Class I lasers in common office devices, including laser pointers, compact disk readers within personal computers, and fiber-optic communication lines. These lasers are built into devices that protect the consumer through engineering design. Staff members also have laser pointers or other equipment that are either Class II or Class III, which have been approved via the SARS process. Based on lasers currently used at the Albany site, a nominal laser safety program has been implemented at the site that adequately protects personnel.

10.5 Air Quality and Protection

Albany has no emissions that require monitoring, reporting, or permitting. In 2009 there were no New Source (Pre-Construction) Reviews for any facilities or projects owned or managed by the Albany site. Operation of the Albany site does not contribute significantly to any emissions under the National Ambient Air Quality Standards (NAAQS). There are no Albany office facilities or projects that are regulated under NESHAP. Albany office facilities and projects do not have the potential to emit more than 10 tons per year of a single designated toxic air pollutant

or more than 25 tons per year in aggregate of all toxic air pollutants, nor are any facilities or projects regulated for any of the 189 toxic air pollutants.

Ozone-depleting refrigerants are used for air conditioning, refrigeration, and chilling. A list of existing ODS is maintained and they are being replaced with more environmentally friendly units on a continual basis.

10.6 Water Quality and Protection Activities

Albany holds a wastewater discharge permit with the City of Albany, which was last renewed in 2006 as part of a four-year cycle. In addition, Albany has also filed a slug discharge control plan with the city; it must be renewed every two years. No storm water permit is held by Albany, since regulation is augmented by the city through the wastewater permit. Albany site activities in 2009 resulted in no unplanned releases, leaks, or spills that would require reporting to governmental agencies.

In 2009, there were no tests of the potable water supplies onsite to verify compliance with the Safe Drinking Water Act standards, since all potable water is supplied via a bottled water contract. This water is provided due to the aging water delivery pipes in most buildings at the site. The water supply for Albany comes from the municipal water distribution network and is used for all applications except drinking.

10.7 EOs and DOE Orders

EO 13423 – Strengthening Federal Environmental, Energy, and Transportation Management

This EO ensures that the federal government exercises leadership in the reduction of petroleum consumption through improvements in fleet fuel efficiency and the use of alternative fuels in alternative fuel vehicles. The Albany office has four vehicles that are leased from GSA, including three passenger vehicles and one stake-bed truck. Of the three passenger vehicles, two are alternate fuel compatible, with a passenger van being bi-fuel, using ethanol-85 (E-85) or gasoline, and a pickup truck being bi-fuel, using compressed natural gas (CNG) or gasoline. The third vehicle is a gasoline-fueled vehicle. E85 fuel supplies are becoming more available regionally, while the Albany site has a slow-fill CNG station. The stake-bed truck is diesel-fueled and is biodiesel-fuel compatible. These vehicles are included in the NETL statistics that are reported to DOE.

This EO requires Albany to ensure that all necessary actions are taken to integrate environmental accountability into day-to-day decision making and long-term planning processes across all agency missions, activities, and functions. Consequently, environmental management considerations must be a fundamental and integral component of Albany policies, operations, planning, and management. Albany, like the rest of the sites, achieves this requirement through its development and implementation of the NETL environmental management system. Through the

NETL environmental management system, NETL ensures that strategies are established to support environmental leadership programs, policies, and procedures, and that senior level managers explicitly and actively endorse these strategies.

Albany was certified to the ISO 14001:1996 standard on November 30, 2005, and has continued to maintain that certification throughout 2009. On March 13, 2006, the Albany site was recertified to the ISO 14001:2004 standard.

This EO also mandates a comprehensive effort to reduce energy consumption by federal facilities. For example, it aims to reduce greenhouse gas emissions attributed to federal facility energy use by 30 percent by 2010, compared to emission levels in 1990.

For Albany, electricity costs are included in overall utility costs. In the main administrative building (Building 1) at Albany, HVAC systems are governed by a building energy management system that uses timers which are on between 6:00 am and 6:00 pm, and sets back temperatures at night, on weekends, and on holidays. Energy efficient lighting has replaced conventional bulbs in the majority of areas on center as part of a Bonneville Power Administration (BPA)-sponsored upgrade program, and the staff buys Energy Star® products when the opportunity arises.

EO 13423 establishes a general approach and goals for affirmative procurement and recycling activities by federal agencies. The Albany site has established a recycling program, including plastics, office paper, newsprint, glass, cans, and bottles. Receptacles are provided for the collection of waste office paper and aluminum cans throughout the facility. Various scrap materials from building maintenance are also sent to recycling.

The Albany office purchases refilled toner cartridges and office paper made with recycled materials.

Albany utilizes the DOE Strategic Integrated Procurement Enterprise System, STRIPES, to buy supplies. This system further encourages affirmative procurement. Individuals who regularly purchase items are instructed to give preference to the purchase of items with recycled content.

DOE Order 435.1 Radioactive Waste Management

The small amount of radioactive waste on the site is a result of historic operations and is managed under the program described above in Section 10.4 Radiation Protection.

10.8 Groundwater and Soil Quality Protection Activities

In 2001, Albany initiated a groundwater protection and monitoring program in accordance with DOE requirements. The program follows the ODEQ Cleanup Programs, with regulatory input from Oregon DEQ. Albany installed 14 monitoring

wells onsite in July 2002, and sampled the wells for a broad range of contaminants, including VOCs, SVOCs, metals, nitrates, and PCBs from all of the wells.

Albany also screened for pesticides, herbicides, dioxins, and radiological constituents from a selected subset of the wells. Initial periodic sampling showed concern over elevated levels of VOCs, metals, and radiological constituents, necessitating continued periodic monitoring. Subsequent periodic monitoring events have shown concern regarding excessive turbidity of samples directly influencing metals and radiological results, which resulted in a review of sampling protocols and a change to require future collection of groundwater samples be performed using U.S. EPA low-stress protocols. This resulted in the discovery of metal and radiological contaminant levels in groundwater at or near background levels for the Willamette Valley in Oregon, where the site is located.

VOC detections during periodic monitoring prompted Albany to further investigate areas of suspected contamination, with planning efforts starting in September 2004 and on-site work initiated in January 2005. Results from samples taken in February 2005 showed contaminants of potential concern (COPCs) were likely crossing the eastern boundary of the site and migrating toward Liberty Elementary School. After meeting with Oregon DEQ and the Greater Albany Public School (GAPS) District personnel, actions were taken to perform site investigations onsite and offsite during March-December 2005. Results of the site investigation showed no concern over surface soils, subsurface soils, soil gas, or ambient air at off-site properties. The only concern identified was with elevated levels of COPCs in groundwater, including trichloroethene (TCE), carbon tetrachloride, and chloroform. Additional monitoring wells have been installed both onsite and offsite at Liberty Elementary School property, which is adjacent to the site (see Figure 10.8.1 for well locations). The results of the 2009 monitoring program are presented in Table 10.8.1–10.8.14.

Oregon DEQ initiated sampling of residential wells within an approximate two-block radius of the site due to concerns of residents voiced at town hall meetings and further reviews of the sampling results. A total of 31 residential wells were sampled, with some residential wells (including some used as drinking water) showing elevated levels of COPCs. All of the owners of wells that were used for drinking water (10) have been connected to City of Albany potable water supplies by NETL, and NETL has already properly closed any wells that residents requested to be abandoned.

Albany is continuing its site investigation activities, periodic monitoring, and remedial actions in accordance with Oregon DEQ requirements and will pursue actions to protect human health and the environment by eliminating risk and minimizing potential exposures.

10.9 Other Major Environmental Issues and Actions

Compliance with 10 CFR 850. Albany has developed a program based on 10 CFR 850 to comply with the objectives of a chronic beryllium disease prevention

program (CBDPP). The program plan was issued in October 2005 and is being updated based on current beryllium area designations. A site inventory of the beryllium contaminations at the Albany site was completed in 2007, which showed several areas across the site to have residual beryllium concentrations above background levels (attributable to soils and building materials). Remedial actions, as well as protective health measures have been instituted at the Albany site, with remedial activities occurring from September 2008 through September 2009. Now that the remedial activities are completed, the Albany site is considered to be beryllium-free and the only remaining program activities will be long-term medical monitoring of personnel who worked at the Albany site during times of known potential beryllium exposure.

Finally, the Albany site instituted a quality assurance program in 2008 to meet the standards of ISO 9001. After an internal review, the Albany site achieved external certification via Orion Registrar in October 2008 and has maintained the certification since then.

SUGAR LAND

11.1 Site Description

The Sugar Land office, which has no laboratory facilities, does not engage in the same compliance assessment processes as the Morgantown, Pittsburgh, or Albany sites. Because building and facility operations and maintenance are under the control of the landlord, the Sugar Land office itself has to comply with few ES&H regulations. Therefore, the Sugar Land office does not undertake in-house audits, external audits, or subject matter reviews, and regulatory agencies do not conduct ES&H inspections or investigations of activities. However, in-house inspections and regulatory agency inspections (e.g., by the local fire marshal or municipal building inspectors) of the building and facilities could occur, with any subsequent findings assessed against the landlord.

Figure CC: City of Sugar Land

Building occupants participate in fire drills, which are conducted according to local fire marshal requirements and in cooperation with the building management. Volunteer fire wardens conduct roll calls during drills and facilitate orderly evacuations. Tornado drills are announced through a building-wide public address system and are conducted in accordance with Occupational Safety and Health Administration emergency response requirements.

The City of Sugar Land (Figure CC) does not impose recycling requirements that would apply directly to office space lessees. Nevertheless, building management has arranged for various recycling activities throughout the office building complex. The landlord is preparing building-wide recycling plans and procedures for future tenant participation.

There were no citations for violations of ES&H laws, regulations, or ordinances in 2009.

11.2 Major Site Activities

All facilities of the NETL office in Sugar Land are located in The Granite Towers, an office building complex. The offices are leased by DOE/ NETL under its own leasing authority. In 2009, the Sugar Land office undertook no actions to alter facilities or operations in a manner that could change the current impacts on the environment around the offices.

COMPLIANCE STATUS

12.1 Environmental Restoration and Waste Management

The Sugar Land office had no offsite remediation activities, no onsite CERCLA/SARA cleanups, and no spills or leaks from facilities or operations that were ongoing during 2009. There were no NPL sites for which NETL-Sugar Land had liability under CERCLA/SARA. There were no cleanups or surveillance activities for leaks or spills that occurred in prior years or other activities that would lead to RCRA cleanups.

Sugar Land office does not have a program to deal with hazardous waste; however, building management does recycle some RCRA universal (semi-hazardous) waste materials. Management also provides pickup and handling services for the disposal or recycling of dry-cell batteries, fluorescent light bulbs, and light ballasts.

12.2 NEPA

Sugar Land does not conduct NEPA reviews for proposed offsite federal actions. These actions relate to contract awards or grants to other governmental organizations, educational institutions, and private industry were completed by NEPA staff in Morgantown, West Virginia. Project managers complete questionnaires regarding the potential for environmental impacts associated with project proposals under consideration for funding or financial support. The completed forms are evaluated by the NEPA compliance officer at the Morgantown site for a determination of the

appropriate level of NEPA review (i.e., EIS, EA, or categorical exclusion). In 2009, all funded projects were determined to be categorical exclusions.

12.3 TSCA and FIFRA

Sugar Land housed no TSCA-regulated substances, and no restricted-use pesticides, herbicides, or defoliants were kept within the offices in 2009 or any other years. The landlord and building management organization provide pest control services and grounds keeping services.

12.4 Radiation Protection

Ionizing Radiation Program.

There are no ionizing radiation sources at Sugar Land.

Laser Program

The Sugar Land office has Class I lasers in common office devices such as laser printers, CD readers within PCs, and fiber-optic communication lines. These lasers are built into devices which protect the consumer through engineering design. Staff members may also have laser pointers that are either Class II or Class III and are commonly used by speakers during lectures and presentations. A laser safety program has not been implemented at the Sugar Land site and is currently viewed as unnecessary due to the absence of more dangerous, higher class lasers onsite.

12.5 Air Quality and Protection Activities

Because it is strictly a project management office implementing oil and gas programs, Sugar Land has no air quality protection program and no emissions that require monitoring, reporting, or permits. In 2009, there were no New Source (Pre-Construction) Reviews for any facilities or projects owned or managed by the Sugar Land office. Operation of the Sugar Land office does not contribute significantly to any violations of NAAQS. No Sugar Land office facilities or projects are regulated under NESHAPS program. Sugar Land office facilities and projects do not have the potential to emit more than 10 tons per year of a single designated toxic air pollutant or more than 25 tons per year in aggregate of all toxic air pollutants, nor are any facilities or projects regulated for any of the 189 toxic air pollutants.

Any ozone-depleting refrigerants used for air conditioning inside the offices are under the control of the building management organization. There are no plans or activities related to the phase out of ozone depleting substances at Sugar Land.

12.6 Water Quality and Protection Activities

The building landlord and the landlord's building management contractor deal with sewer use permits and storm water runoff control and permits. It is assumed that the level of impact on surface water has been about the same as for other office complexes in the region. Sugar Land office activities in 2009 resulted in no unplanned releases, leaks, or spills that would require reporting to governmental agencies.

In 2009, there were tests of the potable water supplies onsite to verify compliance with the Safe Drinking Water Act standards. Testing was performed by the City of Sugar Land (municipal water authority) in compliance with the Safe Drinking Water Act standards, and the report can be reviewed at http://www.sugarlandtx.gov/utilities/reports index. Sugar Land's water supply comes from the municipal water distribution network (City of Sugar Land).

12.7 EOs

EO 13423 -- Strengthening Federal Environmental, Energy, and Transportation Management

This EO requires federal agencies to implement an EMS. However, as previously discussed, the Sugar Land office engages in minimal ES&H activities. The office consists of part of one floor of leased space inside an office building complex. Onsite ES&H activity primarily focuses on Order 231.1 reporting (e.g., worker injury and lost work day data), the NEPA process, and affirmative procurement of office supplies and miscellaneous items. Sugar Land office does not maintain an EMS and is not covered by NETL's system in effect at the Pittsburgh and Morgantown sites. Inclusion of the Sugar Land office may be considered in the future. The Sugar Land office does not have a formal pollution prevention program; however, staff members are involved through activities described under the Pollution Prevention Program above.

Sugar Land's electricity costs are included in the rent. Lights and air conditioning are governed by a building energy management system that uses timers, which are on between 6:00 am and 6:00 pm and off at night, on weekends, and on holidays. Windows in the building are tinted and sealed, further reducing the need for cooling. Energy efficient lighting has replaced conventional bulbs, and the staff buys Energy Star® products when the opportunity arises. The Sugar Land tenant improvement included energy-saving light sensors within the office space. Granite Tower II has received a certification as an Energy Star building, and has applied for LEED Silver certification. Although there is no formal energy efficiency training in place for the Sugar Land office staff, they receive informal education through the use of posters throughout the office. Also, the offices have containers for recyclables.

Sugar Land does not participate in a recycling program Surplus electronic personal property is disposed through qualified recycling vendors both in-place at the Sugar Land office, as well as items that are returned to the Morgantown, West Virginia, site for information sanitization requirements prior to disposal. There are no statistics on the amount of materials recycled on behalf of Sugar Land. Statistics for the personal property disposals of electronic equipment is maintained as part of the personal property record. The Sugar Land office uses the NETL Small Purchase System to buy supplies. This system further encourages affirmative procurement. Individuals who regularly purchase items are instructed to give preference to the purchase of items with recycled content. Large volume items are purchased through the Morgantown warehouse.

12.8 Groundwater and Soil Quality Protection Activities

There are no additional groundwater or soil quality protection activities required at Sugar Land.

12.9 Other Major Environmental Issues and Actions

The Sugar Land site is not aware of any ongoing or pending lawsuits, NOVs, public accusations of regulatory violations, environmental occurrences, or any non-routine releases of pollutants. There were no violations of any compliance agreements or cleanup agreements or any unresolved compliance issues. There were no audits conducted in 2009 under the sponsorship of DOE Headquarters.

FAIRBANKS

13.1 Site Description

Fairbanks, AK, (Figure DD) is located in the heart of Alaska's Interior, on both banks of the Chena River, near its confluence with the Tanana River in the Tanana Valley. By air, Fairbanks is 45 minutes from Anchorage and 3.5 hours from Seattle. It lies 358 road miles (576 km) or a 6-hour drive north from Anchorage.

Figure DD: City of Fairbanks

As of the census of 2000, there were 30,224 people, 11,075 households, and 7,187 families residing in the city. The population density was 948.7 people per square mile (366.3/km²). There were 12,357 housing units at an average density of 387.9/sq mi (149.8/km²). The racial makeup of the city was 66.67 percent White, 11.15 percent Black or African American, 9.91 percent Native American, 2.72 percent Asian, 0.54 percent Pacific Islander, 2.45

percent from other races, and 6.57 percent from two or more races. And, 6.13 percent of the population was Hispanic or Latino of any race.

The median income for a household in the city was $40,577, and the median income for a family was $46,785. Males had a median income of $30,539 versus $26,577 for females. The per capita income for the city was $19,814. About 7.4 percent of families and 10.5 percent of the population were below the poverty line, including 11.6 percent of those under age 18 and 7.0 percent of those age 65 or over.

The scope of NETL's Arctic Energy Office includes promoting research that will lead to more efficient and economical electrical power generation in rural villages The office also supports research into oil and natural gas extraction and utilization. Activities include the development of technical and economic analysis of potential fossil energy recovery activities, evaluation of environmental practices associated with tundra access in support of oil exploration, examining alternatives for electric power generation and transmission for some villages, and facilitating communications with key stakeholders.

Alaska produces about 12 percent of the nation's domestic oil production, about 550,000 barrels per day in 2010. Over 15.7 billion barrels of oil have been produced in Alaska, primarily from the North Slope's Prudhoe Bay Field, about 72 percent of the estimated technically recoverable oil from the currently developed fields. The remaining technically recoverable oil from these fields is about 6.1 billion barrels. Those barrels represent 20 percent of domestic conventional oil reserves.

It is Alaska's potential that is remarkable. The U.S. Geological Survey (USGS) and the Minerals Management Service (MMS) estimate that more than 50 billion barrels of conventional oil remains undiscovered but technically recoverable in the onshore and offshore areas of Alaska. If discovered, this would nearly double U.S. reserves. These estimates place about 10 billion of these barrels in each of northern Alaska's two important onshore areas, the National Petroleum Reserve (NPRA) on the western North Slope and the Alaska National Wildlife Refuge (ANWR) on the eastern North Slope. Additionally, large amounts of shallow viscous oil remain to be developed.

Natural gas in the Arctic, until recently, has been largely overlooked. The considerable natural gas reserves known to exist in the Arctic are in fact a by-product of oil production. Consequently, little is known about the breadth of the Arctic storehouse from a purely natural gas perspective. What is known from the two oil-producing areas is that the Arctic potential for natural gas is significant. In the Alaskan North Slope area alone, about 36 trillion cubic feet (Tcf) awaits construction of a pipeline to the Lower 48 states, and it is estimated that there is another 137 Tcf of technically recoverable natural gas to be discovered. While this amounts to a little less than 10 percent of the Nation's supply, it is significant in that much of the Arctic is still unexplored.

Alaska's identified coal resource is an estimated 170 billion metric tons, roughly half of the U.S. total. However, this resource is undeveloped as a result of the challenges imposed by the Arctic's protected status, remoteness, higher exploration and development cost, and general lower quality. The majority of the Alaskan coal is lignite, sub-bituminous, and bituminous due to their relatively young age of 30 million to 130 million years. The USGS estimates that as much as 5 trillion metric tons of coal could remain undiscovered in Alaska, 70 percent of which lies in Alaska's North Slope Region. Alaskan coal has a low sulfur content compared to coal in the contiguous United States.

On a more regional level, over 40 communities are sited near potential coal resources for electrical power generation and space heating. Given that Alaskans use 1112 MBtu/capita versus the United States average of 333 MBtu/capita, producing the Arctic's energy resources is a challenge and a priority. Research is required to meet the existing and future challenges of finding, producing, and transporting these Arctic resources.

The Fairbanks office is in space rented by GSA on behalf of NETL. The Small Business Administration and Army Corps of Engineers are located in the same building, and the space is inspected annually by GSA to ensure the building complies with all government requirements, including local codes. In 2009, Fairbanks undertook no actions to alter facilities or operations in a manner that could change the current impacts on the environment around the office. Any significant new environmental impacts would be associated with offsite projects supported or funded through the Fairbanks office. As further noted in section 14.4 each project is reviewed independently by NETL for its potential environmental impact before the project is undertaken.

13.2 Environmental Compliance

The Fairbanks office currently houses a single federal employee. Because of the nature of the work (contracts administration, interagency and intergovernmental coordination, and industry outreach), the waste management services are minimal and are provided by the landlord under the terms of the rental agreement.

The Fairbanks office is not required to implement an environmental compliance program. It has never formally implemented a pollution prevention program. The staff practices affirmative procurement whenever possible in Fairbanks (i.e., the procurement of goods containing recycled content or having less life-cycle impact on the environment). There is no formal recycling program within the Fairbanks community. However, the staff does contribute to the local recycling efforts when they are available. The Fairbanks North-Star Borough used to sponsor a paper recycling program that converted waste paper into pellets. The pellets were then used as a substitute fuel for coal in a power plant at the Eielson Air Force Base. Unfortunately, on January 18, 2007, the pelletizer that was used to shred paper and form it into pellets caught fire and was destroyed. As a consequence, paper recycling

in the community was suspended and it is unclear if efforts to revive paper recycling will be successful because of the cost associated with the program.

The local WalMart now accepts paper and plastic bags from the community at its store in Fairbanks, andbackhauls the material to the lower-48. The Arctic Energy Office does not currently collect recyclable paper for delivery to the WalMart for the purpose of recycling because the office is not in close proximity

The Army Corps of Engineers, located adjacent to the Arctic Energy Office, has arranged for a local job training center for disadvantaged youth to pick up spent toner cartridges for local recycling. The Arctic Energy Office has joined in this program and provides its spent cartridges to the same organization.

13.3 NEPA

NETL-Fairbanks requires NEPA reviews for proposed off-site actions. These actions typically involve contract awards to other governmental organizations, educational institutions, and private industry. Project proponents fill out a questionnaire addressing the potential for environmental impacts associated with project proposals that are under consideration for funding or financial support. The completed questionnaire is then reviewed by NETL's NEPA compliance officer for a determination of the appropriate level of NEPA review (i.e., EIS, EA, or categorical exclusion). In 2009, all Fairbanks-funded projects were determined to fall within the level of categorical exclusions.

13.4 EO 13423 Strengthening Federal Environmental, Energy, and Transportation Management

NETL-Fairbanks engages in minimal ES&H activities. The office consists of approximately 2,000 square feet of leased space inside a commercial office building. On-site ES&H primarily focuses on the NEPA process and affirmative procurement of office supplies and miscellaneous items. The office does not maintain an EMS and is not covered by NETL's EMS system in effect at the Pittsburgh and Morgantown sites. Inclusion of Fairbanks into the NETL EMS may be considered at some time in the future if an increase in staff warrants it.

13.5 Other Major Environmental Issues and Actions

Fairbanks staff members are not aware of any ongoing or pending lawsuits, NOVs, public accusations of regulatory violations, environmental occurrences, or any non-routine releases of pollutants. There were no violations of compliance agreements or cleanup agreements, nor were there any unresolved compliance issues. There were no audits conducted in 2009 under the sponsorship of DOE Headquarters, independent regulators, or other independent third parties. GSA conducted an annual inspection of the facility to ensure that safety equipment, bathroom facilities, ventilation, and

elevators are maintained in a safe working condition and to verify that no hazardous materials were stored inappropriately anywhere in the building.

APPENDIX

Acronyms List

ACHD	Allegheny County Health Department
AIIS	Assessment Information Input System
B-	Building
BOD	Biochemical oxygen demand
CBT	Computer-based training
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	U.S. Code of Federal Regulations
CBOD5	Carbonaceous biochemical oxygen demand 5-day test
COD	Chemical oxygen demand
DOE	U.S. Department of Energy
EA	Environmental assessment
EPEAT	Electronic product environmental assessment tool
EIS	Environmental impact statement
EMP	ES&H management plan
EMS	Environmental Management System
EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ES&H	Environmental, Safety, and Health
ES&HMS	Environmental, Safety, and Health Management System
FE	Office of Fossil Energy
FEMP	Federal Emergency Management Program
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FONSI	Finding of no significant impact
FY	Fiscal Year
GPDU	Gas Process Development Unit
GSA	U.S. General Services Administration
HPSB	High Performance and Sustainable Buildings
HVAC	Heating, Ventilation, and Air Conditioning
ISM	Integrated Safety Management
ISO	International Organization for Standardization
LEED	Leadership in Energy and Environmental Design
MCL	Maximum Contaminant Level
MGN	Morgantown, West Virginia
MUB	Morgantown Utility Board
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NETL	National Energy Technology Laboratory
NOV	Notice of Violation

NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
ODEQ	Oregon Department of Environmental Quality
ODS	Ozone-Depleting Substance
PADEP	Pennsylvania Department of Environmental Protection
PCBs	Polychlorinated biphenyls
PGH	Pittsburgh, Pennsylvania
PHA	Pleasant Hills Authority
QA/QC	Quality Assurance/Quality Control
R&D	Research and development
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SARS	Safety Analysis and Review System
sq. ft.	Square feet
SVOC	Semivolatile organic compound
TMDL	Total maximum daily loading
TOC	Total organic carbon
TOX	Total organic halogens
TPH	Total petroleum hydrocarbons
TRI	Toxic release inventory
TSCA	Toxic Substances Control Act
TSD	Treatment, storage, and disposal
TSS	Total suspended solids
VOC	Volatile organic compound
WVDEP	West Virginia Department of Environmental Protection
WWTF	Wastewater treatment facility

Tables and Figures

Table 1.1 ES&H Programs
Affirmative Procurement Advocate/Greening Acquisition Program
Air Quality Program
Alarms Oversight Program
Asbestos and Lead Abatement Program
Authority Having Jurisdiction (AHJ)/Exemptions Program
Assessment Information Input System (AIIS) Program
Beryllium Program
CAIRS Program (Injury/Illness Reporting)
Chemical Handling Facility
Chemical Hygiene Program
Chemical Inventory and MSDS Program
Confined Space Program
Construction and Maintenance Safety Program
Cryogenic Safety Program
Electrical Safety Program
Emergency Preparedness Program/Emergency Response Program
Environmental Management System (EMS) and Safety Management System (SMS) – Management Review Program
Environmental Program
Ergonomics Program
ES&H Communications Program
Records Program
ES&H Training Program
Facility and Area Custodian Program
Facility Work Authorization Program (SOD)
Facility Safety Committee Program
Directives Program
Workers' Compensation Program
Fire Protection Program
Fire Warden Program
Ground Water Quality Program
Hazard Communication Program
Hazardous Waste Program
Hearing Conservation Program

Table 1.1 ES&H Programs
Illumination Quality Program
Inactive Waste Sites/Off-Site Remediation Program
Indoor Air Quality and Ventilation Program
Industrial Hygiene Program
Industrial Wastewater Quality Program
Laser Safety Program
Lessons Learned Program
Life Safety Program
Medical Monitoring Program
NEPA Compliance Program
Non-RCRA Waste Program
Occupational Medicine Program
Occurrence Reporting and Processing System (ORPS) Program
Organization Incident Reporting Program
OSHA Safetyy Program
R&D Projects Program
Radiation Safety Program
Respiratory Protection Program
Safety & Health Program
SARA Title III Program
SARS Program
Soil Quality Program
Storage Tank Program
Surface Water Quality Program
Waste Management Oversight Program
Waste Minimization and Pollution Prevention Program
Water Quality Program
Worker Protection Program

Table 3.3.1 NETL Significant Environmental, Safety, and Health Aspects for CY2010
Waste Minimization, Pollution Prevention, and Recycling
High Performance Sustainable Building Implementation
Hazardous Materials Procurement, Consumption, and Storage
Electronic Stewardship
Energy and Fuel Use
Greenhouse Gas Air Emissions
Green Purchasing
Pest and Other Landscaping Land Management
Accident/Incident Rates
Water Usage
Albany Legacy Issues

Table 3.4.1 CY 2009 Environmental Management Plan Metrics

Environmental Management Plan	Objective/Target	Baseline	2009 Target	Actual
Waste Generation, Management, and Disposal Practices				
1.1 Nonhazardous Waste Generation	By 2010, reduce by 75% the amount of nonhazardous waste generated based on 1993 baseline (641 tonnes) (EO 13423, Sec. 2.e)	641 % Reduction	**167** **(74%)**	**128.99** **80%**
1.2 Hazardous Waste Generation	By 2010, reduce by 90% routine hazardous waste generated based on 1993 baseline (18.46 tonnes) (EO 13423, Sec. 2.e)	18.46 % Reduction	**2.03** **(89%)**	**1.56** **92%**
1.3 Recycling	By 2010, increase to 50% recycling of sanitary waste streams based on 2002 baseline (31%) (EO 13423, Sec. 2.e)	31% % Increase	**49%**	**56%**
Energy and Fuel Use				
2.1 Energy Use	Through the end of FY2015, reduce by 3% energy usage/sq. ft. annually based on FY2003 baseline (219,903 MWh) (EO 13423, Sec. 2.a)	219,903 % Reduction	**193,515** **(12%)**	**163,491** **(26%)**
2.2 Renewable Energy	Increase renewable energy consumption to 3% of total MWh (Epact 2005) Ensure that the use of statutorily required renewable energy consumed is 50% of total MWh (EO 13423, Sec. 2.b)	850.86 28,362	**425.43** **50%** **850.86** **3%**	**43.7** **10%** **43.7** **5%**

Table 3.4.1 CY 2009 Environmental Management Plan Metrics				
Environmental Management Plan	**Objective/Target**	**Baseline**	**2009 Target**	**Actual**
2.3 Petroleum Fuels	Through the end of FY2015, reduce by 2% the vehicle fleet's total annual consumption of petroleum products based on FY2005 baseline (22,942 gallons) (EO 13423, Sec. 2.g)	22,942	**21,107**	**16,936**
		% Reduction	**(8%)**	**26.2%**
2.4 Alternative Fuels	Increase by 10% annually the total non–petroleum-based fuel consumed using an FY2005 baseline (12,547 gallons). (EO 13423, Sec. 2.g)	12,547	**17,566**	**28,391**
		% Increase	**40%**	**126%**
Hazardous Materials Procurement, Consumption, and Storage				
3.1 Chemical Inventory	Reduce the quantity of toxic and hazardous chemicals and materials acquired, used, and discarded (EO 13423, Sec. 2.e)		**Establish the baseline of EPA 31 priority chemicals**	**Baseline of EPA 31 priority chemicals completed**
Air Emissions				
5.1 Class 1 Refrigerants	By 2010, eliminate use of Class 1 refrigerants, to the extent economically practicable and to the extent that safer alternatives are available, based on 2002 baseline inventory (190 lbs) (Clean Air Act)	190 lbs	**22 lbs**	**37.2 lbs**
5.2 Greenhouse Gases	By 2010, reduce by 30% greenhouse gas emissions attributed to facility use through life-cycle cost effective measures based on 1990 baseline (67.4 million lbs)	67.4E+06	**47.9E+06**	**25.61E*lbs of CO_2**
		% Reduction	**(29%)**	**62%**
Green Purchasing				
6.1 Purchase of Electronic Products	Increase to 95% the purchase of electronic products that meet EPEAT standards unless there is no EPEAT standard for such product (EO 13423, Sec. 2.h)	N/A	**95%**	**100%**
Wildlife Management				
7.1 Deer Management	In 2009, reduce the deer population at the PGH and MGN sites and implement a Wildlife Management Program (NETL – deer population problem)	N/A	**Complete wildlife management plan**	**Controlled deer population as needed and continued to discuss proper implementation of wildlife management plan**

Table 3.4.1 CY 2009 Environmental Management Plan Metrics				
Environmental Management Plan	**Objective/Target**	**Baseline**	**2009 Target**	**Actual**
Accident and Incident Rates				
8.1 Recordable Case Rate	In 2009, reduce recordable case rates to a level of 1.5 (FE ESS&H Commitment to ESS&H)	N/A	**1.5**	**0.58**
8.2 Lost Workday Case Rate	In 2009, reduce the day's away/restricted (DART) case rate to a level of 0.6 (FE ESS&H Commitment to ESS&H)	N/A	**0.6**	**0.36**
Corrective Action Management				
9.1 Management of Urgent Corrective Actions	In 2009, increase to 100% the number of urgent corrective actions completed on time (NETL – management concern)	N/A	**100%**	**100%**
9.2 Management of Serious Corrective Actions	In 2009, increase to 75% the number of serious corrective actions completed on time (NETL – management concern)	N/A	**75%**	**89%**
Water Usage				
10.1 Potable Water Intensity	By the end of FY2015, reduce by 2% annually (or a total of 16%) water consumption intensity through life-cycle cost-effective measures based on the FY2007 baseline (28.2E+06 gallons) (EO 13423, Sec. 2.c)	28.2E+06	**27.9E+06**	**19.776E*6 gallons**
		% Reduction	**(4%)**	**30%**

Objective/target was met in 2009

Objective/target was not met in 2009

Table 4.4.1 Radioactive Materials Inventory – Morgantown

Isotope	Activity/Date Determined	Source	Location
Kr-85	2 mCi 03/30/81	Model #3077, Serial #700T, Thermosystems Inc.	B-16, Radioactive Material Storage Cabinet
Kr-85	2 mCi 01/02/79	Model #3012, Serial #467T, Thermosystems Inc.	B-16, Radioactive Material Storage Cabinet
Kr-85	2 mCi 05/19/80	Model #3012, Serial #626T, Thermosystems Inc.	B-16, Radioactive Material Storage Cabinet
Kr-85	2 mCi 05/78	Model #3077, Serial #373T, Thermosystems Inc.	B-25, Room 212
Kr-85	2 mCi 03/30/81	Model #3077, Serial #697T, Thermosystems Inc.	B-25, Room 212
Ni-63	10 mCi 03/01/04	Analyzer S/N 787AN, cell serial #2103, Molecular Analytics, Inc.	B3 150
Sc-46	0.065 mCi 07/01/90	University of Missouri	B-16, Radioactive Material Storage Cabinet
Sc-46	0.046 mCi 02/12/91	University of Missouri	B-16, Radioactive Material Storage Cabinet
Ra-226	9 uCi 01/56	Model #B-5, Serial #11205, Mettler Corp.	B-25, Room 206
Ra-226	21 uCi 01/56	Model #M-5, Serial #17032, Mettler Corp.	B-25, Room 112
Ra-226	9 uCi 01/56	Model #B-5 GD, Serial #13805, Mettler Corp.	B-3, Area 150
Phosphate Rock	Consumer Product	Model #1080, Sun Nuclear Corp.	B-16, Radioactive Material Storage Cabinet
H-3	20 Ci 5/94	Model #B100/U10, Serial #575263, SRB Technologies	B-33
H-3	20 Ci 5/94	Model #B100/U10, Serial #574434, SRB Technologies	B-33
H-3	20 Ci 5/94	Model #B100/U10, Serial #574435, SRB Technologies	B-33
H-3	20 Ci 5/94	Model #B100/U10, Serial #574436, SRB Technologies	B-33
Co-57	12 mCi 12/95	Model #IPL CUS, Serial #EE661, Isotope Products Lab	B-16, Industrial Hygiene Laboratory
Cs-137	1 uCi 2/99	Tele-Atomic, Inc	B-25, Room 202
Cs-137	10 uCi 2/99	Tele-Atomic, Inc.	B-25, Room 202
Ba-133	1 uCi 2/99	Tele-Atomic, Inc.	B-25, Room 202
Ba-133	10 uCi 2/99	Tele-Atomic, Inc	B-25, Room 202
Tl-204	1 uCi 2/99	Tele-Atomic, Inc.	B-25, Room 202
Tl-204	10 uCi 2/99	Tele-Atomic, Inc.	B-25, Room 202
Cd-109	10 mCi 5/04	Model #XFB3205, Serial #NR2032, IPL Inc.	B-33
Po-210	5mCi 9/06	P-2042 Cell Serial #A2FH133, NRD, Inc.	B13 Diesel Test Cell

Table 4.4.2 X-Ray Radiation Generating Devices – Pittsburgh

Device	Quantity	Location
X-Ray Tube	1	B-902, Mail Sorting Facility
X-Ray Diffraction Instrument	1	B-94, X-Ray Diffraction Laboratory
Scanning Electron Microscope (SEM)	1	B-94, SEM Laboratory
Electron Spectroscopy for Chemical Analysis	2 X-Ray Tubes	B-94, Electron Spectroscopy for Chemical Analysis Laboratory

Table 4.4.3 Radioactive Material – Pittsburgh				
Isotope	**Qty.**	**Activity**	**Supplier/Source**	**NRC License**
Ni-63	2	15 mCi	Gas Chromatograph Electron Capture Device – **Out of Service**	Held by Hewlett Packard
Cs-137	3	40 mCi (2); 20 mCi (1)	Ronan Engineering Company, Model 137; Level Density Gauge – **Out of Service**	Held by Parsons
Assorted	80	Consumer Product	Smoke Detectors	Not Required

Table 4.6.1 NETL HPSB Candidates				
Building	Site	Gross Sq. Ft.	% HPSB Guiding Principles Achieved	FY HPSB Met
B-39	MGN	108,000	100%	2009
Day Care	MGN	9,800	100%	2011
B-925	PGH	9,326	60%	2011
B-58	PGH	32,240	55%	2011
B-921	PGH	25,033	50%	2012
B-920	PGH	12,363	60%	2012
B-26	MGN	63,616	45%	2014
B-1	MGN	51,598	45%	2015
Albany site buildings are being reevaluated for HPSB guiding principles				

Table 4.13.1 Summary of Permits – Morgantown			
Permit No. and Name	**Issue Date, Exp. Date**	**Regulatory Agency**	**Description**
MUB 012 Industrial Wastewater Discharge Permit	07/01/2005, 06/30/2010	MUB	This permit allows for the operation of wastewater pretreatment facilities and discharge into MUB's sanitary sewer system. It sets discharge limits and monitoring requirements, compliance with the Morgantown Industrial Waste Ordinance, reporting requirements including accidental discharge reporting, and testing procedures.
WV0111457 General WV/NPDES Storm Water Permit	04/01/2004, 03/31/2009	WVDEP, Office of Water Resources	This general permit covers storm water associated with industrial activity. It identifies activities that are covered by the permit and the associated monitoring and analysis requirements for each. Also discussed are the Storm Water Pollution Prevention Plan and Groundwater Protection Management Plan required by the permit.

Table 4.13.1 Summary of Permits – Morgantown

Permit No. and Name	Issue Date, Exp. Date	Regulatory Agency	Description
WVG610042 Registration Permit for General WV/NPDES Storm Water Permit	12/07/2004, 03/31/2009	WVDEP, Office of Water Resources	The general permit registration allows NETL to operate under permit WV0111457, above. The registration establishes the schedule for submission of discharge monitoring reports, as well as discussions on monitoring, sampling, and analysis requirements. This registration makes the general WV permit applicable to NETL.

Table 4.13.2 Summary of Permits – Pittsburgh

Permit No., Exp. Date	Permit Type	Regulatory Agency	Description
7032056-000-00500 A Title V permit was formally issued 01/06/09. The expiration date is 01/05/14.	Air	ACHD	PGH site is a minor source for PM, PM_{10}, SO_2, VOCs, NO_x, CO, and HAPs as defined in section 2101.20 of Article XXI of ACHD.
GF 47497.009 The permit was issued 04/28/09. A minor revision was made 10/14/09.	Industrial Sewer Use	PHA	Establishes the permissible waste water effluent discharge of certain process/laboratory/wastewater constituents.
PA0025844 07/11/01 A renewal application was submitted 01/11/09, but a new permit has not yet been issued.	Storm Water Discharge	PADEP	NPDES permit for the discharge of site storm water into the public waterways of Pennsylvania.
PA0297201 N/A	Industrial Settling Weir	PADEP	Permit for an industrial settling weir owned by the U.S. National Institute of Occupational Safety and Health.
02-81183008A 10/04/2009	Aboveground Storage Tank Registration	PADEP	Permit for tank containing ferric chloride.
02-81183009A 10/04/2009	Aboveground Storage Tank Registration	PADEP	Permit for tank containing caustic soda.
S-343	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground gasoline storage tank.
S-343	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground diesel fuel storage tank.
S-343	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground No. 2 fuel oil storage tank.

Table 4.13.2 Summary of Permits – Pittsburgh			
Permit No., Exp. Date	**Permit Type**	**Regulatory Agency**	**Description**
S-1018	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground ethanol storage tank.
S-1102	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground gasoline storage tank.
S-1102	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground diesel fuel storage tank.
PAA-080548	Asbestos	ACHD	Asbestos Abatement Permit for B-94, 4th floor.

Table 4.13.3 Summary of Permits – Albany			
Permit No., Exp. Date	**Permit Type**	**Regulatory Agency**	**Description**
8731-02 12/14/10	Industrial Wastewater Discharge	City of Albany	Discharge industrial wastewater to sanitary sewer.

Table 4.16.1 Surveillance Monitoring – Pittsburgh and Morgantown					
Type of Surveillance	**Contact**	**Type of Monitoring**	**Key Characteristics**	**Frequency**	**Location**
SARS review	ES&H Division	Review of requirements in SARS procedure	Operational control, document control	Annually	Various laboratories, support operations, and facilities
Transformer inspection (MGN)	EG&G	Visual assessment of oil-filled transformer	Regulatory compliance	Daily	Site-wide
Transformer inspection (PGH)	SAIC	Visual assessment of oil-filled transformer	Regulatory compliance	Weekly	Site-wide
Storage tank inspection (MGN)	EG&G	Visual assessment of oil-filled storage tanks	Regulatory compliance	Weekly	Site-wide
Interstitial storage tank monitoring (MGN)	EG&G	Interstitial monitoring of dual-wall tanks	SPCC plan compliance, regulatory compliance	Quarterly	B-29, B-36, Navy facility fuel storage tanks
Storage tank inspection (PGH)	SAIC	Visual assessment of oil-filled storage tanks	Regulatory compliance	Weekly	Site-wide
Radiation gauge survey	Parsons	Leak test of radiation sources	Regulatory compliance	Semi-annually	At radiation sources, B-84

Table 4.16.1 Surveillance Monitoring – Pittsburgh and Morgantown

Type of Surveillance	Contact	Type of Monitoring	Key Characteristics	Frequency	Location
Safety observer inspection (PGH)	EG&G	Visual inspections of work sites	Contractor ISM observance, operational control	Semi-annually	Site-wide
Water usage (PGH)	Site Operations Division	Document water usage	Operational	Daily	B-83, B-84, B-93, B-94, chillers, boiler house
Backup generators (PGH)	SAIC	Backup generator inspection	Operational	Weekly	Site-wide
Chemical handling facility (PGH)	EG&G	CHF operations inspection checklist	Operational	Daily	B-64, B-91, B-92

Table 6.1.1 Potential Contamination Sources and Cleanup Actions – Morgantown

Potential Source	Potential Contamination	Current Status
Underground storage tanks	BTEX	All tanks removed 1991 or before.
42-inch coal gasifier	Coal tar, polynuclear hydrocarbons, BTEX	Gasifier removed; soil removed to a depth of 10 feet in 1994.
Stretford Pad	Stretford solution (vanadium and cadmium compounds)	Pad removed; soil removed to a depth of 10 feet in 1994.
Wastewater Pond 001	Coal tar, polynuclear hydrocarbons, BTEX, metals	Removed in 1995; site filled and re-graded.
Wastewater Pond 002	Coal tar, polynuclear hydrocarbons, BTEX, metals	Removed in mid-1980s.
Wastewater Pond 005	Coal tar, polynuclear hydrocarbons, BTEX, cyanide, metals	Removed in 1985; backfilled and paved as a parking lot.
Contaminated sewer lines	Mercury	Removed the contaminated portion of the lines, which stretched from B-1 to a point east of B-3. The line from B-3 to Burroughs Run was left in place and is still being used as the major storm water drainage line for the site. This is a 15" vitrified tile line that discharges to Burroughs Run at the 002 outfall.
Underground process lines used to convey contaminated process water from the old 42" fixed-bed gasifier and/or B-4 to an activated carbon treatment system and Pond 005.	Coal tar, polynuclear hydrocarbons	Capped and abandoned in place. They were/are not part of any NETL sewer system (e.g., storm, sanitary, or contaminated).

Table 6.1.2 Properties of Potential Contaminants

Contaminant Suite	Potential Contaminant	Density (g/ml)	Physical State	Water Solubility	Sorption Coefficient	Carcinogenic
			@ approx. 20° C		log KOC	
Coal Tar	Acenaphthylene	0.899	Solid	3.93 mg/L	3.68	
Polynuclear Hydrocarbons	Acenaphthene	1.069	Solid	3.47-3.93 mg/L	3.79	
	Benzo(b)fluoranthene		Solid	0.0012 mg/L	5.74	potential
	Benzo(k)fluoranthene		Solid	0.00055 mg/L	6.64	potential
	Benzo(a)anthracene	1.274	Solid	0.01-0.44 mg/L	6.14	+
	Benzo(a)pyrene	1.351	Solid	0.003 mg/L	5.60-6.29	+
	Benzo(e)pyrene	0.8769	Solid	0.004 mg/L	5.6	+
	Biphenyl (diphenyl)	0.866	Solid	7.5 mg/L	3.23	
	Chrysene	1.28	Solid	0.0015-0.006 mg/L	5.39	weak
	Coronene		Solid	0.00014 mg/L	7.8	
	o-Cresol (2-methylphenol)	1.041	Solid	24,500 mg/L	1.34	
	Dibenzofuran	1.0886	Solid	10 mg/L	3.91-4.10	
	Dibenz(a,h)anthracene	1.282	Solid	0.005 mg/L	6.22	+
	Fluoranthene	1.252	Solid	0.275 mg/L	4.62	potential
	Fluorene	1.203	Solid	1.9 mg/L	3.7	potential
	Indene	1.006	Liquid			
	3-Methylcholanthrene					+
	Methyldibenzofuran					
	Methylphenanthrene (1,2,3,4-)	1.161	Solid	0.073 mg/L	4.56	
	1-Methylnaphthalene	1.025	Liquid	26-28 mg/L		
	2-Methylnaphthalene	1.006	Solid	24.6-25.4 mg/L	3.87-3.93	
	4-Methylphenol (p-Cresol)	1.0347	Solid	19,400 mg/L	1.69	
	Naphthalene	1.152	Solid	30 mg/L	2.74-3.52	-
	Phenanthrene	1.025	Solid	1.6 mg/L	3.72-4.59	-
	Phenol (carbolic acid)	1.0576	Solid	82,000 mg/L	1.24-1.43	
	Pyrene	1.271	Solid	0.16 mg/L	4.22-5.65	+
	Triphenylene	1.302	Solid	0.38 mg/L	4.0-6.9	
BTEX	Benzene	0.878	Liquid	1,780 mg/L	1.69-2.00	+
	Ethylbenzene	0.867	Liquid	152 mg/L	1.98-2.41	
	Toluene	0.8669	Liquid	538 mg/L	1.89-2.49	
	m-Xylene	0.8842	Liquid	146-160 mg/L	2.26	
	o-Xylene	0.8802	Liquid	176 mg/L	1.68-1.83	
	p-Xylene	0.8611	Liquid	156-185 mg/L	2.52	
Stretford Solution	Vanadium	6.11	Solid			
	Cadmium	8.642	Solid			
Contaminated Sewer	Mercury	13.534	Liquid			

Table 6.1.3 Hazardous Waste Generation – Morgantown

Waste Stream	Qty. Generated (lbs)	Qty. Shipped (lbs)
Poison (Toxic Solids & Liquids)	549	549
Mercury/Mercury Compounds	2	2
Waste Corrosive Liquids	245	245
Waste Solvents/Flammable Liquids	1,663	1,663
Waste Oxidizers	113	113
Flammable Solids	72	72
Activated Carbon	7	7
Other RCRA Compounds	37	37
Fluorescent Light Tubes (Universal Waste)	683	683
Batteries (Universal Waste)	847	847
TOTAL	**4,218**	**4,218**

Table 6.6.1.a NPDES Permit Storm Water Monitoring Requirements – Morgantown			
Outfall	**Pollutants of Concern**	**Low Concentration Cutoff Waiver**	**Frequency**
002	Nitrite and nitrate Fecal coli form	0.68 mg/L Report only	6 month 6 month
005	TSS Fecal coli form	100 mg/L Report only	6 month 6 month
010	Biochemical oxygen demand (BOD) TSS Ammonia Fecal coli form pH Chemical oxygen demand (COD) Oil and grease	30 mg/L 100 mg/L 4 mg/L Report only 9 s.u. 120 mg/L 15 mg/L	6 month 6 month 6 month 6 month 6 month 6 month 6 month

TSS = total suspended solids

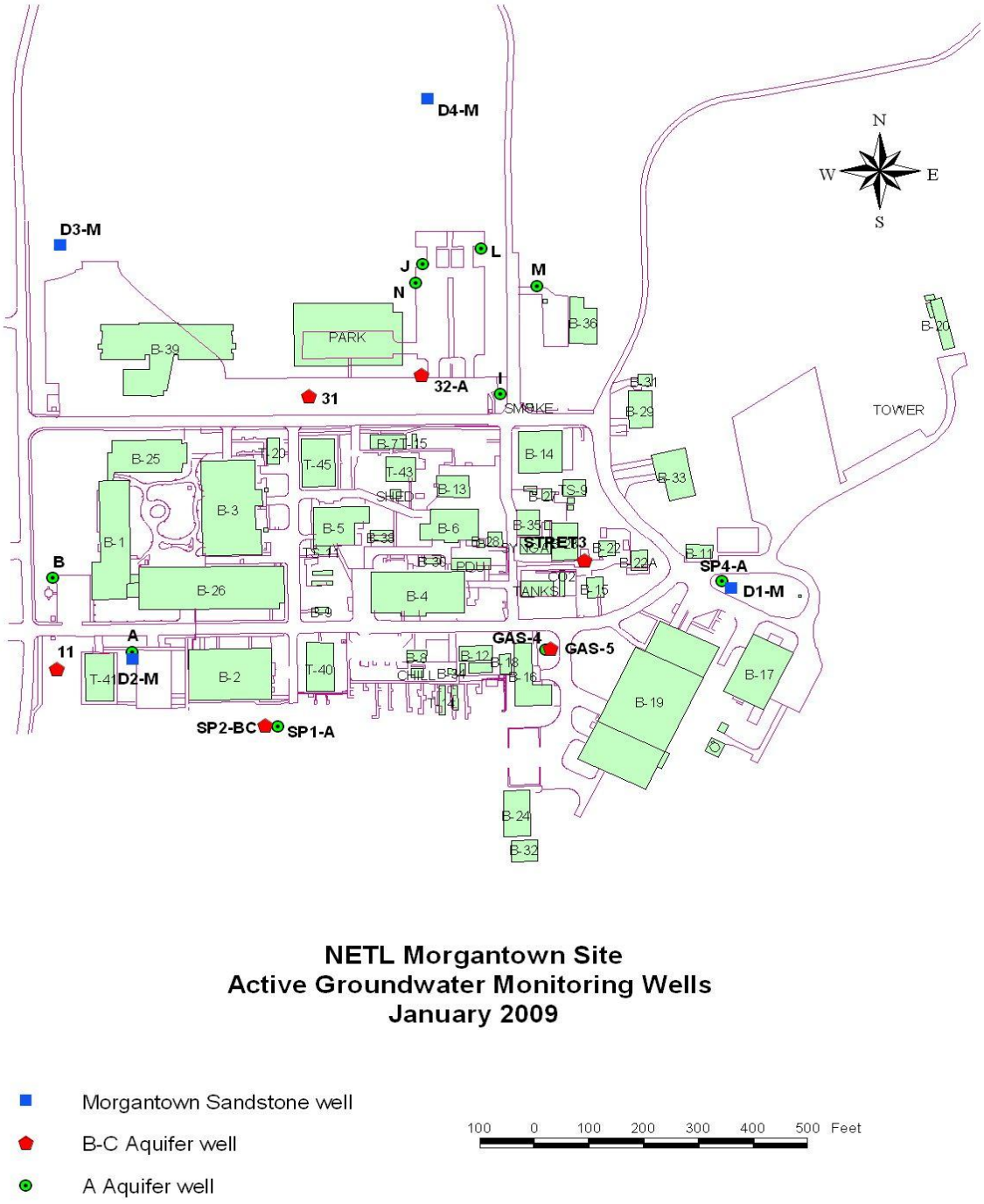
Table 6.6.1.b NPDES Storm Water Analysis Results – Morgantown							
		Outfall 002		**Outfall 005**		**Outfall 010**	
Constituents	**Low Conc. Cutoff Waiver**	**Mar.**	**Aug.**	**Mar.**	**Aug.**	**Mar.**	**Aug.**
Nitrate + Nitrite (Grab)	0.68 mg/L	0.64 mg/L	0.47 mg/L	NS	NS	NS	NS
Ammonia (Grab)	4 mg/L	NS	NS	NS	NS	ND	0.9 mg/L
Fecal Coli Form (Grab)	---	52 col/ 100 mL	4,800 col/ 100 mL	10 col/ 100 mL	>6,000 col/ 100 mL	48col/ 100 mL	>6,000 col/ 100 mL
TSS (Grab)	100 mg/L	NS	NS	9 mg/L	7 mg/L	26 mg/L	272 mg/L
BOD	30 mg/L	NS	NS	NS	NS	ND	2.6 mg/L
pH	9 s.u.	NS	NS	NS	NS	7.6 s.u.	8.2 s.u.
COD	120 mg/L	NS	NS	NS	NS	146	22.8 mg/L
Oil and Grease	15 mg/L	NS	NS	NS	NS	ND	ND

ND = not detected; NS = not sampled; TSS = total suspended solids

Table 6.6.1.c Wastewater Effluent Analysis (lb/d); Pretreatment Permit, Outfall 001, One Sample/Month – Morgantown													
Parameter	**Limit**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
Flow (MGD)													
Monthly Avg.	0.09	0.01	0.01	0.01	0.02	0.04	0.02	0.01	0.02	0.01	0.01	0.002	0.01
Daily Max.	0.15	0.04	0.03	0.03	0.04	0.07	0.04	0.04	0.05	0.02	0.03	0.004	0.02
BOD5													
Monthly Avg.	None	ND	ND	0.4	0.7	ND	1.0	ND	ND	ND	ND	0.9	ND
Daily Max.	None	ND	ND	1.3	1.4	ND	1.9	ND	ND	ND	ND	2.7	ND
TSS													
Monthly Avg.	None	0.6	ND	ND	ND	1.9	11.3	ND	ND	ND	ND	1.1	ND
Daily Max.	None	0.3	ND	ND	ND	3.3	22.7	ND	ND	ND	ND	3.3	ND
Arsenic													
Monthly Avg.	0.005	ND	ND	ND	ND	ND	ND	ND	ND	0.0002	ND	0.0001	0.0002
Daily Max.	0.008	ND	ND	ND	ND	ND	ND	ND	ND	0.0003	ND	0.0001	0.0003
Cadmium													
Monthly Avg.	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium													
Monthly Avg.	0.007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	0.011	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper													
Monthly Avg.	0.04	0.002	0.008	0.002	0.003	0.03	0.005	0.007	0.005	0.001	0.001	0.0005	0.002
Daily Max.	0.06	0.007	0.023	0.005	0.007	0.05	0.01	0.03	0.01	0.002	0.003	0.002	0.003
Cyanide													
Monthly Avg.	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead													
Monthly Avg.	0.025	0.0003	0.0001	0.0001	ND	ND	0.0005	ND	0.0003	ND	ND	ND	0.0003
Daily Max.	0.038	0.001	0.0003	0.0003	ND	ND	0.001	ND	0.0008	ND	ND	ND	0.0005
Mercury													
Monthly Avg.	0.0006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	0.0009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel													
Monthly Avg.	0.01	0.0003	0.0003	0.0002	0.0003	0.001	0.0006	0.0001	0.0002	0.0002	0.0003	0.0001	0.0002
Daily Max.	0.015	0.001	0.001	0.0005	0.0007	0.002	0.001	0.0003	0.0004	0.0003	0.0008	0.0001	0.0003
Silver													
Monthly Avg.	0.011	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	0.017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc													
Monthly Avg	0.2	0.009	0.005	0.003	0.012	0.03	0.02	0.003	0.005	0.004	0.003	0.003	0.009
Daily Max	0.3	0.04	0.015	0.008	0.023	0.05	0.04	0.01	0.01	0.008	0.010	0.008	0.018
Iron													
Monthly Avg	None	0.06	0.03	0.03	0.06	0.22	ND	0.01	0.02	0.03	0.02	0.01	0.04
Daily Max	None	0.23	0.09	0.18	0.13	0.39	ND	0.05	0.05	0.05	0.06	0.04	0.07
Manganese													
Monthly Avg	None	0.01	0.02	0.02	0.03	0.02	0.02	0.01	0.02	0.02	0.01	0.002	0.008
Daily Max	None	0.05	0.05	0.06	0.06	0.04	0.05	0.05	0.05	0.04	0.04	0.006	0.017
Phenolics													
Monthly Avg	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOX													
Monthly Avg													
Daily Max	None	0.003	0.003	ND	ND	0.024	ND	0.003	0.006	0.003	0.004	0.001	0.015
	None	0.013	0.009	ND	ND	0.043	ND	0.013	0.016	0.006	0.012	0.002	0.030
Organics													
Alachlor-1254	None	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS
All others	None	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS

Table 6.6.1.c Wastewater Effluent Analysis (lb/d); Pretreatment Permit, Outfall 001, One Sample/Month – Morgantown													
Parameter	**Limit**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
pH (s.u.)													
Minimum	6.0	6.7	6.6	6.7	6.8	6.8	7.5	7.4	7.1	7.4	7.4	7.8	7.5
Maximum	9.0	8.9	8.9	8.9	7.8	7.8	7.9	7.9	8.8	7.8	8.8	8.8	8.9

MGD = millions of gallons per day; NS = not sampled; ND = not detected; TSS = total suspended solids; BOD5 = biological oxygen demand for 5-day period; s.u. = standard units



NETL Morgantown Site
Active Groundwater Monitoring Wells
January 2009

- Morgantown Sandstone well
- B-C Aquifer well
- A Aquifer well

100 0 100 200 300 400 500 Feet

Figure 6.7.1 Active Monitoring Wells at the Morgantown Site

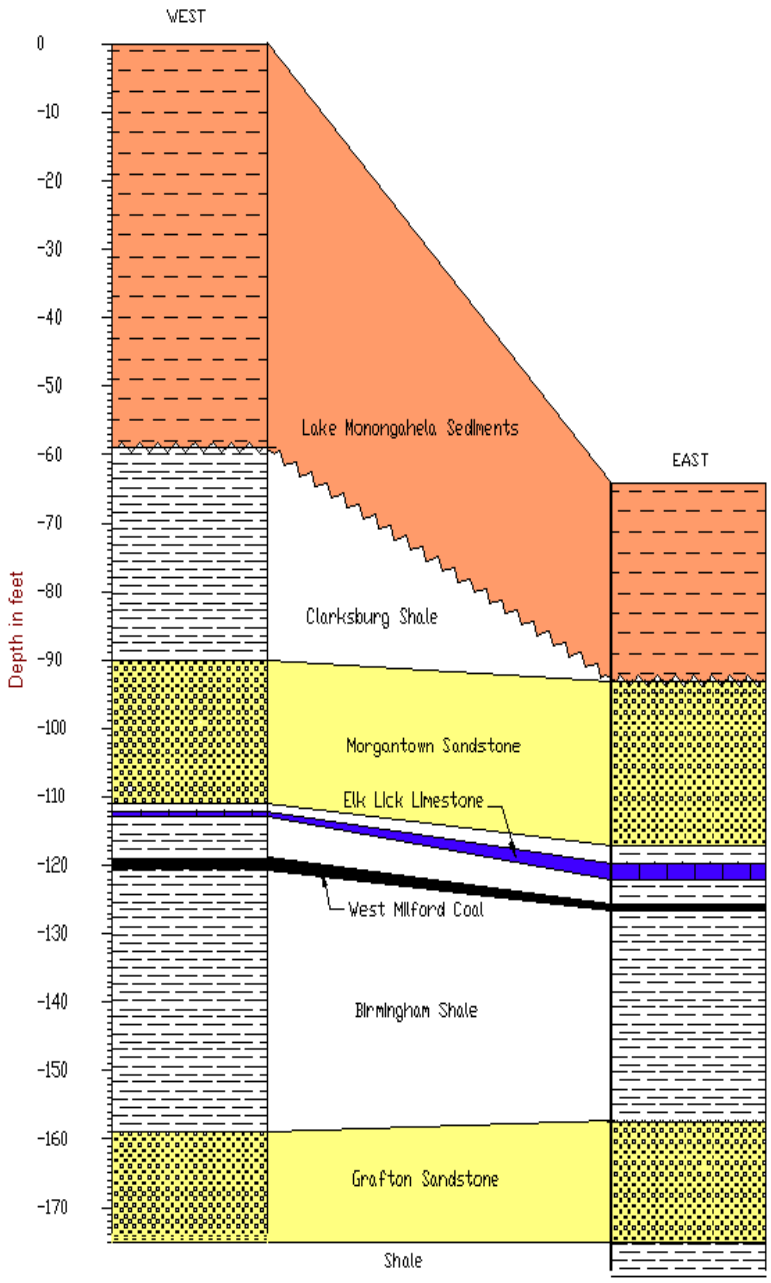


Figure 6.7.2 Generalized Cross-Section of Aquifer Units at the Morgantown Site

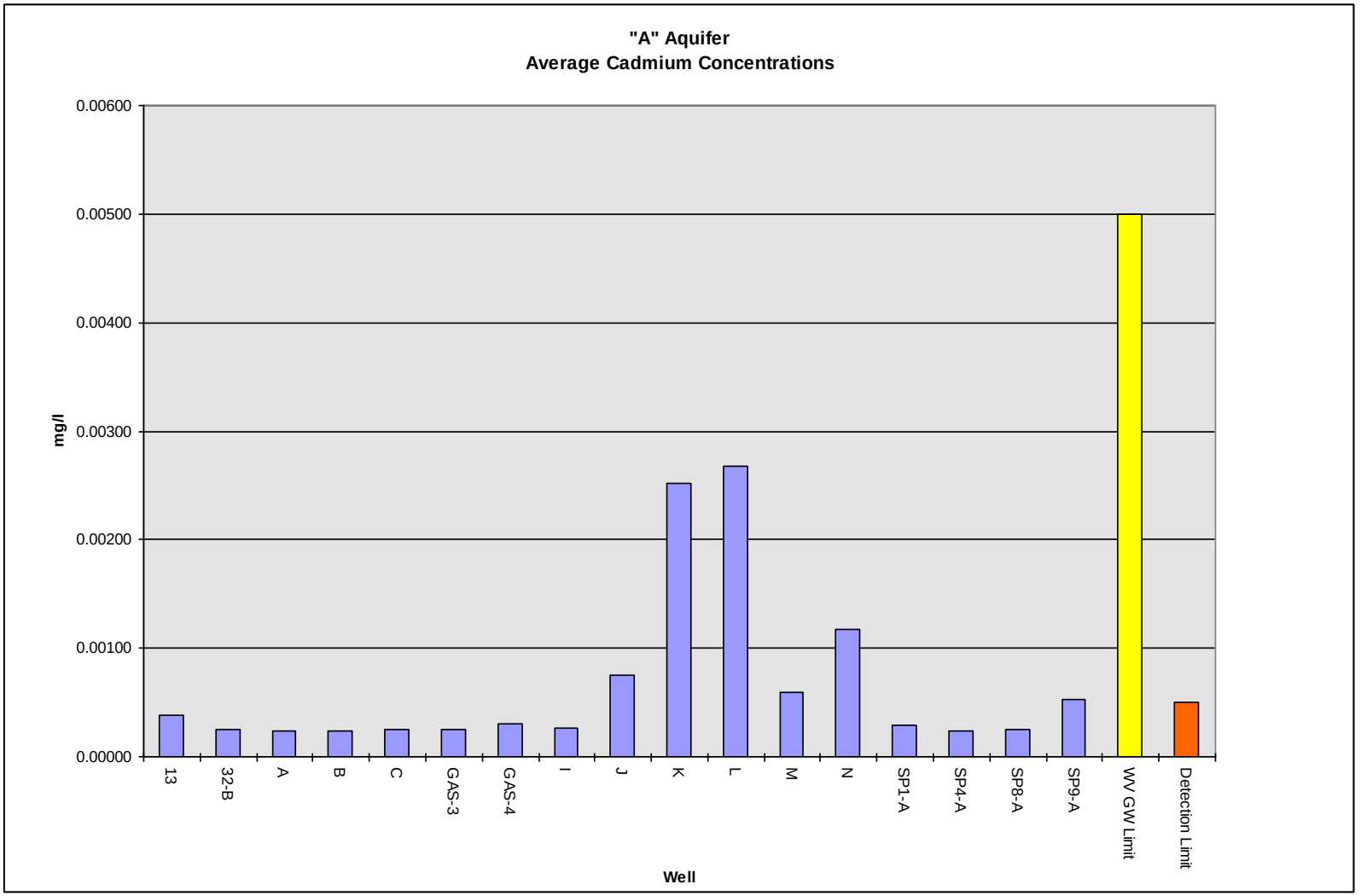


Figure 6.7.3 Average Cadmium Concentrations in Wells, "A" Aquifer, Lake Monongahela Unconsolidated Sediments – Morgantown

Table 6.7.1 May 2009 Groundwater Data for "A" Aquifer –Morgantown															
	Sample Location														
PARAMETER	**MDL**	**UNITS**	**A**	**B**	**GAS-4**	**I**	**J**	**L**	**M**	**N**	**SP1-A**	**SP4-A**	**K**	**SP8-A**	**SP9-A**
Benzene	0.99	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Toluene	0.85	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Ethylbenzene	0.62	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Total Xylenes	2	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Benzo(a)pyrene	0.1	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Arsenic	0.0027	mg/L	0.0057	0.0599	ND	0.0166	ND	0.003	ND	ND	0.006	ND	P&A	P&A	P&A
Cadmium	0.00013	mg/L	ND	0.0011	ND	ND	0.00091	0.0017	0.00054	0.0017	ND	ND	P&A	P&A	P&A
Chloride	0.053	mg/L	0.56	1.2	78	7.8	261	709	61.8	307	12.2	42.6	P&A	P&A	P&A
Chromium	0.005	mg/L	0.0583	0.346	0.0035	0.0047	0.0026	0.0109	0.0012	0.00093	0.0094	ND	P&A	P&A	P&A
Copper	0.0027	mg/L	0.0082	0.134	ND	ND	ND	0.0035	0.0035	ND	0.0084	ND	P&A	P&A	P&A
Cyanide	0.0015	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Fluoride	0.0039	mg/L	ND	ND	ND	ND	ND	ND	0.12	ND	ND	0.023	P&A	P&A	P&A
Iron	0.0119	mg/L	22.4	150	10.5	48.2	1.06	1.52	1.68	1.6	51	3.2	P&A	P&A	P&A
Lead	0.0013	mg/L	0.0041	0.0983	ND	0.0028	0.0016	0.0017	0.0022	0.0015	0.0082	ND	P&A	P&A	P&A
Manganese	0.00068	mg/L	0.853	2.74	0.881	0.452	0.248	0.097	3.34	0.611	1.88	0.248	P&A	P&A	P&A
Mercury	0.000038	mg/L	ND	0.000068	ND	ND	ND	ND	0.00013	ND	ND	ND	P&A	P&A	P&A
Nickel	0.0016	mg/L	0.0126	0.223	0.0022	0.0036	0.0698	0.0762	0.0348	0.109	0.0072	ND	P&A	P&A	P&A
Nitrate Nitrogen	0.0077	mg/L	ND	ND	0.17	ND	0.85	0.42	0.61	0.54	ND	0.055	P&A	P&A	P&A
Silver	0.00068	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Sulfate	0.031	mg/L	13.8	25.1	10	10.8	54.8	86.5	77.4	66.1	46.2	21	P&A	P&A	P&A
TOX	0.019	mg/L	ND	ND	ND	ND	ND	0.0248	0.0315	0.044	ND	0.0331	P&A	P&A	P&A
Total Recoverable Phenolics	0.0014	mg/L	ND	0.0037	0.0018	ND	0.0018	0.0032	ND	ND	0.0016	0.0045	P&A	P&A	P&A
Zinc	0.0025	mg/L	0.0133	0.383	0.0056	0.0101	0.0899	0.0677	0.066	0.177	0.0236	0.0088	P&A	P&A	P&A

ND = not detected; P&A = well plugged; TOX = total organic halogens

Table 6.7.2 May 2009 Groundwater Data for "B-C" Aquifer – Morgantown								
	Sample Location							
PARAMETER	**MDL**	**UNITS**	**11**	**31**	**32-A**	**GAS-5**	**SP2-BC**	**STRET3**
Benzene	0.99	ug/l	ND	ND	ND	ND	ND	ND
Toluene	0.85	ug/l	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.62	ug/l	ND	ND	ND	ND	ND	ND
Total Xylenes	2	ug/L	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	0.12	ug/l	ND	ND	ND	ND	ND	ND
Arsenic	0.0027	mg/L	ND	ND	0.0039	ND	ND	0.0029
Cadmium	0.00013	mg/L	0.00018	0.001	ND	ND	ND	ND
Chloride	0.053	mg/L	10	521	154	81.4	6.5	6
Chromium	0.0057	mg/L	0.0023	0.0029	0.0166	0.00078	0.0025	0.0262
Copper	0.0027	mg/L	0.0036	0.0041	0.0065	ND	ND	0.0044
Cyanide	0.0015	mg/L	ND	ND	ND	ND	ND	ND
Fluoride	0.0039	mg/L	ND	0.043	ND	0.059	0.006	0.047
Iron	0.0119	mg/L	30.2	0.0284	12.2	0.847	1.87	16.6
Lead	0.0013	mg/L	0.0022	0.0017	0.0071	ND	0.0038	0.002
Manganese	0.00068	mg/L	0.972	1.21	2.04	0.263	0.177	1.63
Mercury	0.000038	mg/L	ND	ND	ND	ND	ND	ND
Nickel	0.0016	mg/L	0.0017	0.0469	0.0307	ND	0.0023	0.0071
Nitrate Nitrogen	0.0077	mg/L	ND	0.64	0.49	1.4	ND	ND
Silver	0.00068	mg/L	ND	ND	ND	ND	ND	ND
Sulfate	0.031	mg/L	12	83.6	39.5	34.1	14.6	3.5
TOX	0.019	mg/L	ND	ND	0.0335	0.0203	ND	ND
Total Recoverable Phenolics	0.0014	mg/L	0.0034	0.0045	0.0059	0.0022	0.0032	0.0044
Zinc	0.0025	mg/L	0.0222	0.082	0.0516	0.0065	0.0085	0.0177

ND = not detected; TOX = total organic haologens

Table 6.7.3 May 2009 Groundwater Data for Morgantown Aquifer						
	Sample Location					
PARAMETER	**MDL**	**UNITS**	**D1-M**	**D2-M**	**D3-M**	**D4-M**
Benzene	0.99	ug/l	ND	ND	ND	ND
Toluene	0.85	ug/l	ND	ND	ND	ND
Ethylbenzene	0.62	ug/l	ND	ND	ND	ND
Total Xylenes	2	ug/L	ND	ND	ND	ND
Benzo(a)pyrene	0.12	ug/l	ND	ND	ND	ND
Arsenic	0.0027	mg/L	0.007	0.0079	ND	ND
Cadmium	0.00013	mg/L	ND	ND	ND	ND
Chloride	0.053	mg/L	19.9	0.92	3.1	89.3
Chromium	0.0057	mg/L	0.0018	0.014	ND	0.00057
Copper	0.0027	mg/L	ND	0.0097	ND	ND
Cyanide	0.0015	mg/L	ND	ND	ND	ND
Fluoride	0.0039	mg/L	ND	0.34	0.045	0.1
Iron	0.0119	mg/L	13	9.22	0.299	0.816
Lead	0.0013	mg/L	0.0014	0.0064	ND	ND
Manganese	0.00068	mg/L	1.48	0.261	0.0572	0.0189
Mercury	0.000038	mg/L	ND	ND	ND	ND
Nickel	0.0016	mg/L	0.0046	0.0138	ND	ND
Nitrate Nitrogen	0.0077	mg/L	ND	0.2	ND	0.62
Silver	0.00068	mg/L	ND	ND	ND	ND
Sulfate	0.031	mg/L	36.7	0.66	6.9	9.4
TOX	0.019	mg/L	0.0318	ND	ND	ND
Total Recoverable Phenolics	0.0014	mg/L	0.0034	0.0055	0.0029	0.0056
Zinc	0.0025	mg/L	0.0222	0.0442	0.0042	0.0038

ND = not detected; TOX = total organic halogens

Table 6.7.4 October 2009 Groundwater Data for "A" Aquifer – Morgantown															
	Sample Location														
PARAMETER	**MDL**	**UNITS**	**A**	**B**	**GAS-4**	**I**	**J**	**L**	**M**	**N**	**SP1-A**	**SP4-A**	**K**	**SP8-A**	**SP9-A**
Benzene	0.99	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Toluene	0.85	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Ethylbenzene	0.62	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Total Xylenes	2	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Benzo(a)pyrene	0.11	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Arsenic	0.0027	mg/L	ND	0.0043	ND	0.0049	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Cadmium	0.00013	mg/L	ND	ND	ND	ND	0.0012	0.00035	0.00082	0.0017	ND	ND	P&A	P&A	P&A
Chloride	0.053	mg/L	0.75	1.1	1.1	6	266	469	82.6	309	11.2	44.2	P&A	P&A	P&A
Chromium	0.00057	mg/L	0.0037	0.0073	0.0041	0.0029	0.0017	0.0066	0.0012	ND	0.0027	0.0012	P&A	P&A	P&A
Copper	0.0027	mg/L	ND	0.0065	ND	ND	ND	0.0065	ND	ND	ND	ND	P&A	P&A	P&A
Cyanide	0.0016	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	P&A	P&A	P&A
Fluoride	0.0039	mg/L	0.011	ND	ND	ND	ND	0.24	0.3	0.042	ND	0.044	P&A	P&A	P&A
Iron	0.0119	mg/L	24.7	40.6	26.3	27.3	0.212	3.97	0.0776	1.29	28.9	3.43	P&A	P&A	P&A
Lead	0.0013	mg/L	0.0014	0.0049	ND	ND	ND	0.003	0.002	ND	0.0015	ND	P&A	P&A	P&A
Manganese	0.00068	mg/L	0.893	1.34	2.49	0.487	0.238	0.16	4.06	0.64	1.41	0.673	P&A	P&A	P&A
Mercury	0.000038	mg/L	ND	ND	ND	ND	ND	ND	0.000074	ND	ND	ND	P&A	P&A	P&A
Nickel	0.0016	mg/L	ND	0.0047	0.0109	0.0027	0.0767	0.0258	0.0335	0.112	0.0018	0.0032	P&A	P&A	P&A
Nitrate Nitrogen	0.0077	mg/L	ND	ND	ND	ND	0.65	0.64	0.62	0.5	ND	ND	P&A	P&A	P&A
Silver	0.00068	mg/L	0.00072	ND	0.00084	ND	ND	ND	0.00086	ND	ND	ND	P&A	P&A	P&A
Sulfate	0.031	mg/L	17.9	25.9	0.054	12.2	54.1	116	76.8	66.9	47.1	20.4	P&A	P&A	P&A
TOX	0.019	mg/L	ND	ND	0.0261	0.031	ND	0.0338	ND	ND	ND	ND	P&A	P&A	P&A
Total Recoverable Phenolics	0.0014	mg/L	Invalid data	Invalid data	Invalid data	Invalid data	Invalid data	Invalid data	Invalid data	Invalid data	Invalid data	Invalid data	P&A	P&A	P&A
Zinc	0.0025	mg/L	0.005	0.022	0.0064	0.0066	0.0936	0.0377	0.0667	0.179	0.0075	0.0057	P&A	P&A	P&A

ND = not detected; P&A = well plugged; TOX = total organic halogens

Table 6.7.5 October 2009 Groundwater Data for "B-C" Aquifer – Morgantown								
	Sample Location							
PARAMETER	MDL	UNITS	11	31	32-A	GAS-5	SP2-BC	STRET3
Benzene	0.99	ug/l	ND	ND	ND	ND	ND	ND
Toluene	0.85	ug/l	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.62	ug/l	ND	ND	ND	ND	ND	ND
Total Xylenes	2	ug/L	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	0.11	ug/l	ND	ND	ND	ND	ND	ND
Arsenic	0.0027	mg/L	ND	ND	ND	ND	ND	0.0027
Cadmium	0.00013	mg/L	ND	0.00024	0.0013	ND	ND	ND
Chloride	0.053	mg/L	12.1	162	454	83.3	8.5	9.1
Chromium	0.00057	mg/L	0.0024	0.0026	0.00094	0.00067	0.0014	0.015
Copper	0.0027	mg/L	ND	ND	ND	ND	ND	0.0178
Cyanide	0.0016	mg/L	ND	ND	ND	ND	ND	ND
Fluoride	0.0039	mg/L	ND	ND	0.17	0.31	0.072	ND
Iron	0.0119	mg/L	28.4	0.218	ND	0.0274	0.501	37.3
Lead	0.0013	mg/L	0.002	ND	ND	ND	ND	0.0114
Manganese	0.00068	mg/L	1.02	1.82	1.27	0.0038	0.042	1.61
Mercury	0.000038	mg/L	ND	ND	ND	ND	ND	0.000067
Nickel	0.0016	mg/L	0.0021	0.0229	0.0504	ND	ND	0.0132
Nitrate Nitrogen	0.0077	mg/L	ND	0.5	0.64	0.84	0.04	ND
Silver	0.00068	mg/L	ND	ND	ND	ND	ND	ND
Sulfate	0.031	mg/L	13.6	38.5	77.7	32.4	18.1	4.5
TOX	0.019	mg/L	ND	0.0251	0.222	0.0402	ND	ND
Total Recoverable Phenolics	0.0014	mg/L	Invalid data	Invalid data	Invalid data	Invalid data	Invalid data	Invalid data
Zinc	0.0025	mg/L	0.007	0.0212	0.0688	0.0033	0.0042	0.0942

ND = not detected; TOX = total organic halogens

Table 6.7.6 October 2009 Groundwater Data for Aquifer – Morgantown						
	Sample Location					
PARAMETER	MDL	UNITS	D1-M	D2-M	D3-M	D4-M
Benzene	0.99	ug/l	ND	ND	ND	ND
Toluene	0.85	ug/l	ND	ND	ND	ND
Ethylbenzene	0.62	ug/l	ND	ND	ND	ND
Total Xylenes	2	ug/L	ND	ND	ND	ND
Benzo(a)pyrene	0.11	ug/l	ND	ND	ND	ND
Arsenic	0.0027	mg/L	0.0057	0.0061	ND	ND
Cadmium	0.00013	mg/L	ND	ND	ND	ND
Chloride	0.053	mg/L	23.2	1.2	3.1	84.9
Chromium	0.00057	mg/L	0.0014	0.0168	0.0011	0.00069
Copper	0.0027	mg/L	ND	0.0077	ND	ND
Cyanide	0.0016	mg/L	ND	ND	ND	ND
Fluoride	0.0039	mg/L	0.039	0.76	0.34	0.16
Iron	0.0119	mg/L	12.4	10.6	0.59	0.489
Lead	0.0013	mg/L	ND	0.0038	ND	ND
Manganese	0.00068	mg/L	1.55	0.325	0.0623	0.0149
Mercury	0.000038	mg/L	ND	ND	ND	ND
Nickel	0.0016	mg/L	0.004	0.0152	ND	ND
Nitrate Nitrogen	0.0077	mg/L	ND	0.025	0.49	0.64
Silver	0.00068	mg/L	ND	ND	ND	ND
Sulfate	0.031	mg/L	35.9	1.8	12.6	11.2
TOX	0.019	mg/L	ND	ND	0.0212	ND
Total Recoverable Phenolics	0.0014	mg/L	Invalid data	Invalid data	Invalid data	Invalid data
Zinc	0.0025	mg/L	0.0162	0.0411	0.0077	0.0055

ND = not detected; TOX = total organic halogens

Table 8.1.1 Tier II Chemical Inventory Reporting List – Pittsburgh			
Chemical Name	CAS #	Ave. and Max. Daily Amount (lbs)	TPQ (lbs)
Nitrogen, liquid	7727-37-9	74,085	10,000
Nitric oxide	10102-43-9	672	100
SO_2	7446-09-5	2,549	500

Table 8.2.1 TSCA Chemicals Held Onsite in Excess of 10 Lbs. – Pittsburgh	
Common Name	**CAS**
Naphthalene, 1,2,3,4-tetrahydro-	000119-64-2
Carbon Tetrachloride	000056-23-5
Boric Acid	010043-35-3
Nitric Acid	007697-37-2
Hydrochloric Acid	007647-01-0
N-Hexane	000110-54-3
Sodium Acetate	000127-09-3
CO_2	000124-38-9
Ethyl Acetate	000141-78-6
Ferric Chloride	007705-08-0
Methanol	000067-56-1

Table 8.4.1 2009 Radioactive Material – Pittsburgh				
Isotope	**Qty.**	**Activity**	**Supplier/Source**	**NRC License**
Ni-63	2	15 mCi	Gas Chromatograph Electron Capture Device – **Out of Service**	Held by Hewlett Packard
Cs-137	3	40 mCi (2); 20 mCi (1)	Ronan Engineering Company, Model 137; Level Density Gauge – **Out of Service**	Held by Parsons
Assorted	80	Consumer Product	Smoke Detectors	Not Required

Table 8.4.2 2009 Other Radiation-Generating Devices: X-Ray Devices – Pittsburgh		
Device	**Qty.**	**Location**
X-Ray Tube	1	B-902, Mail Sorting Facility
X-Ray Diffraction Instrument	1	B-94, X-Ray Diffraction Laboratory
Scanning Electron Microscope	1	B-94, Scanning Electron Microscope Laboratory
Electron Spectroscopy for Chemical Analysis	2 X-Ray Tubes	B-94, Electron Spectroscopy for Chemical Analysis Laboratory

Table 8.5.1 Air Emissions Based on Fuel Usage – Pittsburgh					
Estimated Emissions (Tons/Yr.)					
Pollutant	**MMCF**	**Combined Boilers**	**Unpaved Roads**	**Paved Roads**	**Total Site**
CO	40	1.49	.01	0.1	1.6
Lead	40	.00001	0	0	.0000010.0
NO_2	40	1.83	0.0004	0.007	1.84
PM_{10}	40	0.11	0.05	0.16	0.21
PM Total	40	0.15	0.31	.9	1.36
SO_2	40	0.01	0	0	0.01
VOCs	40	0.1	0	0.01	0.11

Table 8.6.1 Industrial Sewer Use Permit (B-74) Monitoring Analysis – Pittsburgh									
Constituent	**Free Cyanide**	**Total Cyanide**	**Phenol**	**Copper**	**Mercury**	**Zinc**	**Lead**	**Chloroform**	**pH**
Permit Limit	**< 0.005 mg/L**	**3.21 mg/L**	**0.025 mg/L**	**0.08 mg/L**	**< 0.00012 mg/L**	**0.19 mg/L**	**10.6 mg/L**	**< 5 µg/L**	**6.0 – 9.0 s.u.**
Sampling Date: 04/08/09									
B-74 Effluent									
Composite	ND (< 0.010 mg/L)	ND (<0.010 mg/L)	ND (<0.040 mg/L)	0.0023 mg/L	0.000070 mg/L	0.0033 mg/L	N/A	ND (<5.0 µg/l)	N/A
Grab #1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.60 s.u.
Grab #2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.43 s.u.
Grab #3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.69 s.u.
Grab #4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.48 s.u.
Sampling Date: 10/27/09									
B-74 Effluent									
Composite	ND (< 0.010 mg/L)	ND (<0.010 mg/L)	N/A	0.0132 mg/L	ND (<0.0002 mg/L)	N/A	0.0012 mg/L	N/A	N/A
Grab #1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.09 s.u.
Grab #2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.93 s.u.
Grab #3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.05 s.u.
Grab #4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.99 s.u.

ND = not detected; s.u. = standard units; N/A= not applicable

Table 8.6.2 B-74 2009 Monthly Monitoring Results (mg/L) – Pittsburgh													
		01/07	02/04	03/04	04/08	05/06	06/03	07/08	08/05	09/02	10/27	11/04	12/02
Constituent	Permit Limit	Test America	Test America	Test America	Test America	Test America	Test America	Test America	Test America	Test America	Test America	Test America	Test America
Aluminum	None	0.130	0.263	0.274	0.254	0.0911	0.0796	0.0542	0.0368	0.273	0.286	1.210	0.192
Cadmium	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	None	0.00090	0.0014	0.00072	0.00061	ND	0.00065	ND	0.00052	0.00054	ND	ND	0.00065
Copper	0.08	0.0043	ND	ND	ND	ND	0.0061	ND	ND	0.0098	0.010	0.0051	0.0130
Cyanide (free)	<0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOX	None	0.0244	0.0772	0.0345	ND	ND	0.121	ND	ND	0.0355	0.119	ND	0.0545
Iron	None	0.0329	0.0244	0.0908	0.0792	0.394	0.248	0.0459	0.223	0.040	0.074	0.139	0.414
Lead	None	ND	ND	ND	ND	ND	ND	ND	ND	0.0019	0.0012	ND	0.0012
Mercury	<0.0002	0.000022	ND	ND	0.000056	0.000024	ND	ND	ND	0.000044	ND	0.000038	0.000062
Nickel	None	0.0022	0.0028	ND	ND	ND	0.0015	ND	ND	0.0012	0.0010	ND	0.0017
Oil and Grease	None	ND	ND	ND	ND	ND	ND	ND	55.0	26.9	ND	ND	ND
pH (s.u.)	6.0-9.0	8.6	7.0	7.6	6.4	7.4	7.0	8.6	7.0	7.2	7.0	7.0	7.2
Phenolics	0.025	ND	ND	ND	0.032	ND	0.010	0.094	0.098	0.022	ND	ND	ND
TSS	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tin	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloromethane	<0.005	ND	0.0064	ND	0.0017	ND	0.00094	0.00086	0.0045	ND	0.0079	ND	0.052
Zinc	None	0.0091	0.0055	0.0091	0.0018	0.0225	0.0088	0.0036	0.0026	0.0037	0.0055	0.0062	0.0305

ND = not detected; s.u. = standard units; TOX = total organic halogens; TSS = total suspended solids

Table 8.6.3 National Pollutant Discharge Elimination System Storm Water Analysis Results – Pittsburgh				
Constituent	**Sample Date**			
	02/27/09	**06/11/09**	**09/21/09**	**12/15/09**
North Outfall – PGH				
Flow	0.111 MGD	4.213 MGD	0.208 MGD	0.172 MGD
Suspended Solids	ND (< 2.0 mg/L)	369 mg/L	3.6 mg/L	ND (< 2.0 mg/L)
CBOD5	ND (< 2.0 mg/L)	9.6 mg/L	ND (< 2.0 mg/L)	ND (< 2.0 mg/L)
Oil and Grease	ND (< 0.46 mg/L)	ND (< 1.5 µg/L)	ND (< 1.5 mg/L)	ND (< 1.5 mg/L)
Aluminum	0.0824 mg/L	4.27 mg/L	0.239 mg/L	0.0935 mg/L
Iron	0.207 mg/L	14.1 mg/L	0.554 mg/L	0.356 mg/L
Manganese	0.37 mg/L	0.84 mg/L	0.58 mg/L	0.202 mg/L
Lead	ND (< 1.5 µg/L)	25.2 µg/L	ND (< 1.2 µg/L)	ND (< 1.2 µg/L)
Mercury	0.039 µg/L	0.5 µg/L	0.088 µg/L	0.04 µg/L
pH	8.08 s.u.	7.73 s.u.	7.92 s.u.	8.41 s.u.
Ammonia	0.23 mg/L	0.74 mg/L	0.33 mg/L	0.18 mg/L
South Outfall – PGH				
Flow	0.301 MGD	3.989 MGD	4.669 MGD	0.428 MGD
Suspended Solids	116 mg/L	73.2 mg/L	34 mg/L	15.6 mg/L
Aluminum	12.9 mg/L	1.78 mg/L	6.75 mg/L	2.09 mg/L
Iron	3.59 mg/L	1.9 mg/L	0.383 mg/L	0.52 mg/L
Manganese	0.628 mg/L	0.162 mg/L	0.758 mg/L	0.217 mg/L
Lead	7.8 µg/L	7.5 µg/L	ND (< 1.2 µg/L)	ND (< 1.2 µg/L)
pH	7.6 s.u.	7.74 s.u.	7.72 s.u.	7.82 s.u.
Ammonia	1.5 mg/L	0.63 mg/L	0.1 mg/L	1.9 mg/L

ND = not detected; MGD = millions of gallons per day; s.u. = standard units

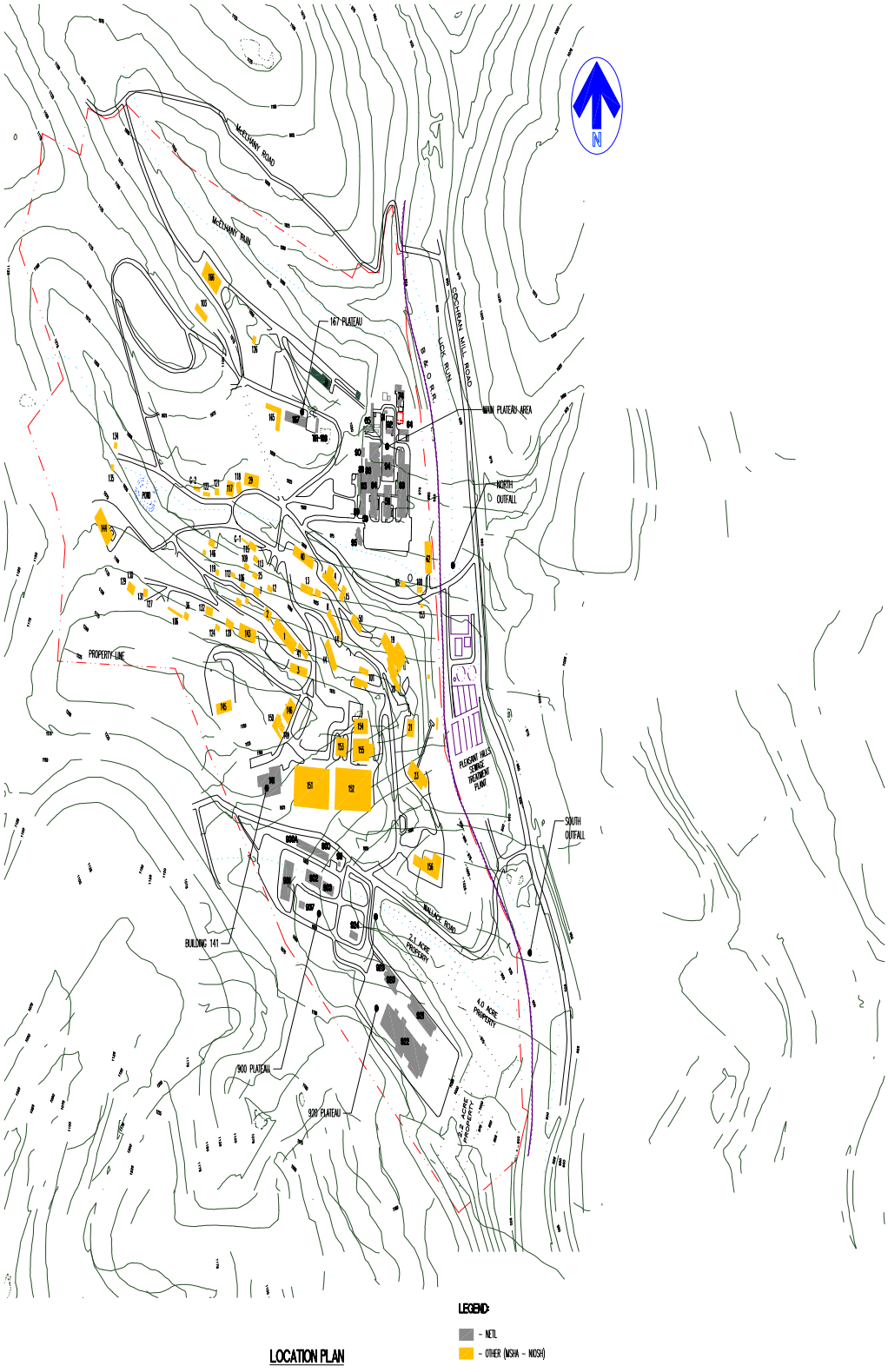


Figure 8.7.1 **Topographic Site Map – Pittsburgh**

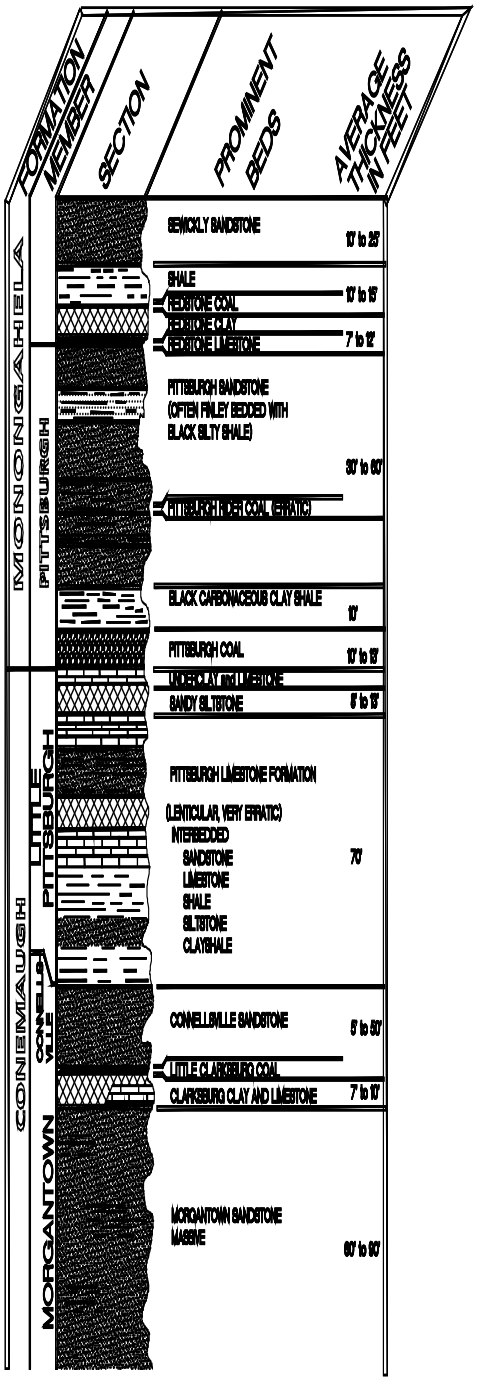


Figure 8.7.2 General Geologic Column – Pittsburgh

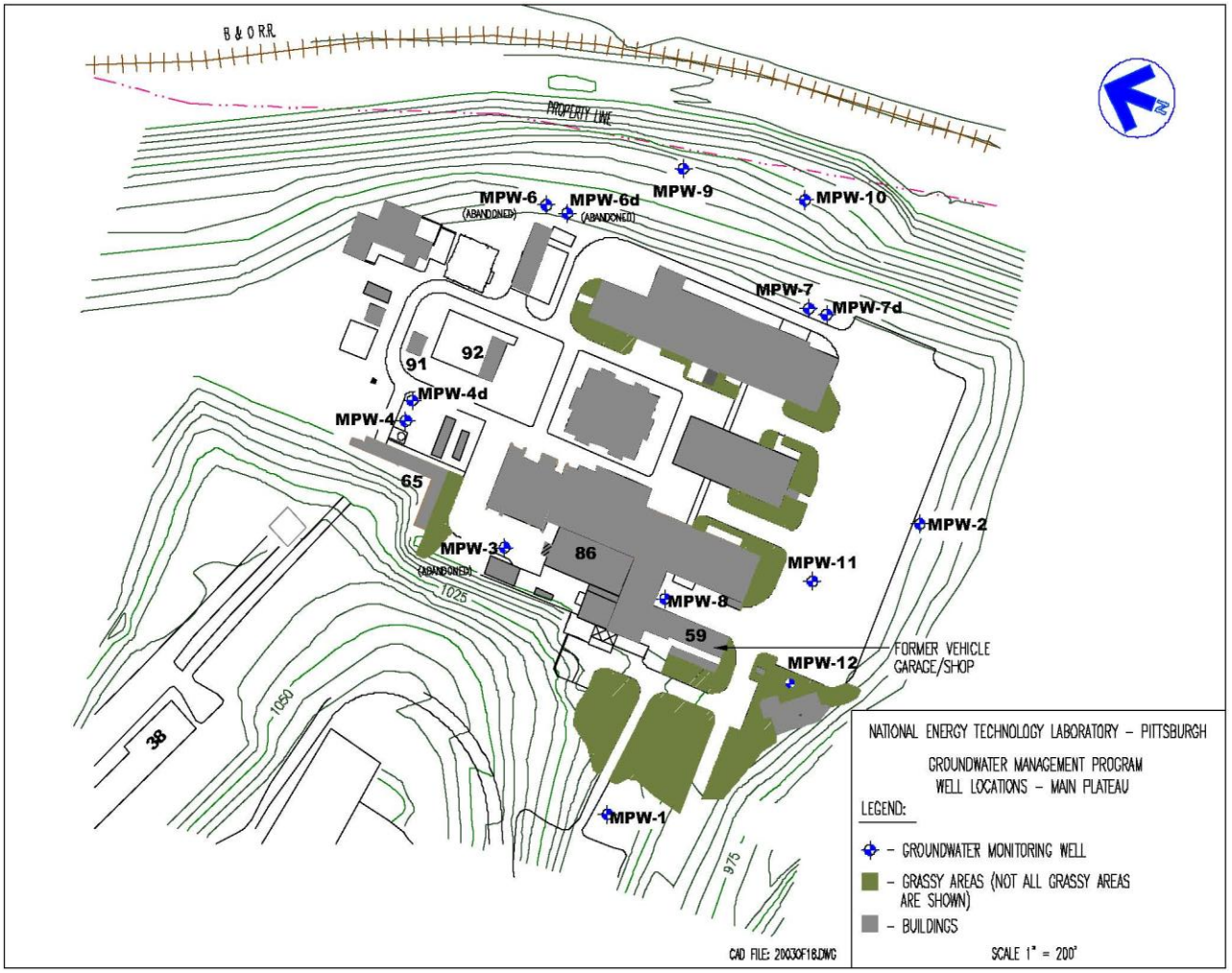


Figure 8.7.3 Groundwater Management Program Main Plateau Well Locations – Pittsburgh

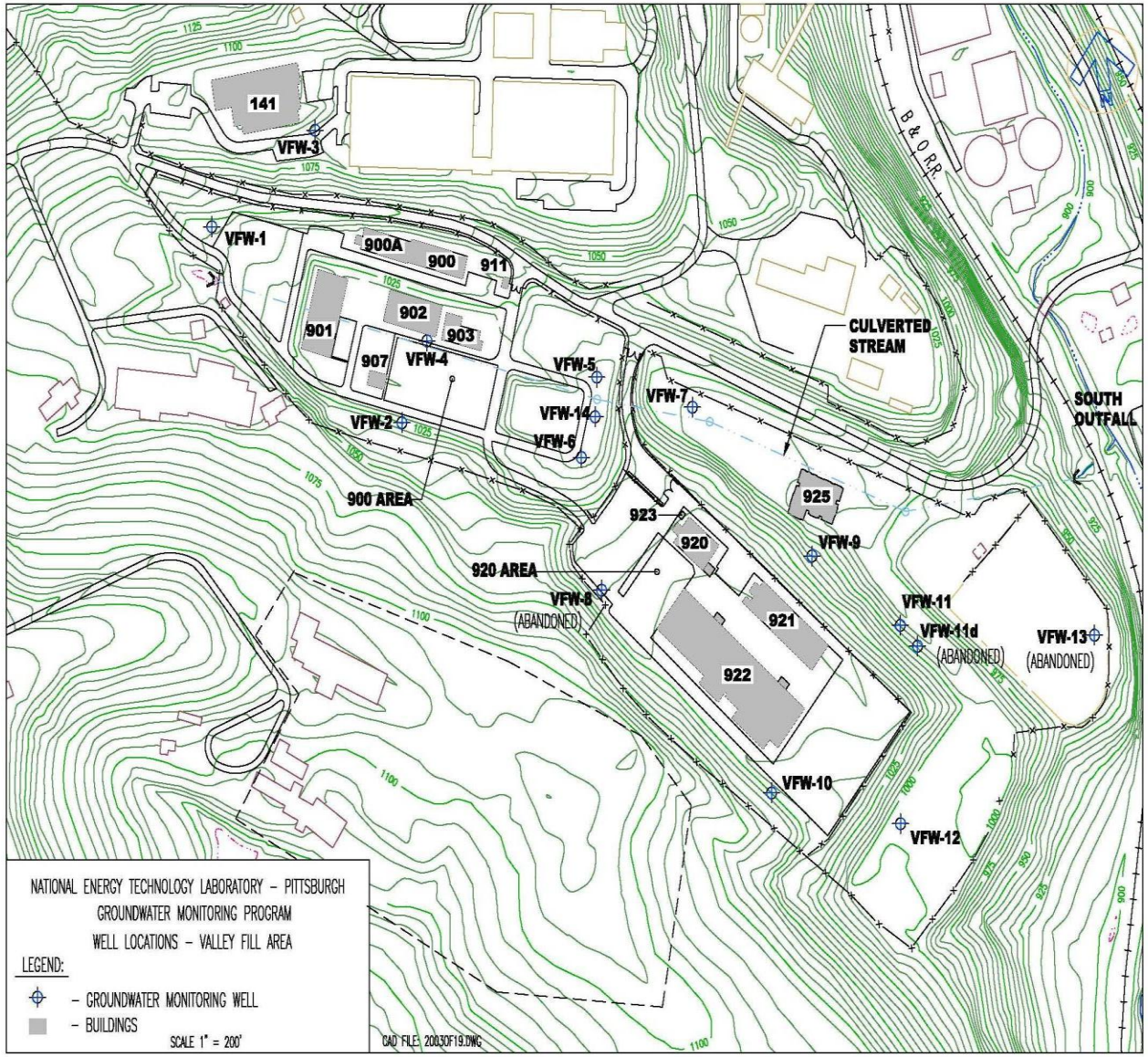


Figure 8.7.4 Groundwater Management Program Valley Fill Well Locations – Pittsburgh

Table 8.7.1 2009 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Main Plateau – VOC Constituents – Pittsburgh				
	Well Number, Sample Date			
	MPW-8	MPW-9	MPW-10	MPW-11
Constituent	10/21/09	10/21/09	10/21/09	10/20/09
Acetone	ND	ND	ND	ND
Benzene	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND
1,1-Dichloroethane	13	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND
Cis-1,2-Dichloroethene	ND	ND	ND	ND
Trans-1,2-Dichloroethene	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
Cis-1,3-Dichloropropene	ND	ND	ND	ND
Trans-1,3-Dichloropropene	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND
Methyl acetate	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND
Methylcyclohexane	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND
Methyl tert-butyl ether	ND	ND	ND	ND
Styrene	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND
Trichloroethene (TCE)	ND	ND	ND	ND
Trichlorofluromethane	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ND	ND	ND

Table 8.7.1 2009 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Main Plateau – VOC Constituents – Pittsburgh

Constituent	Well Number, Sample Date			
	MPW-8	MPW-9	MPW-10	MPW-11
	10/21/09	10/21/09	10/21/09	10/20/09
Toulene	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND
Xylenes (total)	ND	ND	ND	ND

ND = not detected

Exceeded EPA Region III Risk Based Table

Table 8.7.2 2009 Groundwater Detection Monitoring Program Results of Analysis – Groundwater Samples, Valley Filled – VOC Constituents (ug/L) – OK – Pittsburgh

Constituent	Well Number, Sample Date				
	VFW-2	VFW-2-1	VFW-3	VFW-10	VFW-14
	10/19/09	10/19/09	10/20/09	10/20/09	10/19/09
Acetone	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	ND	ND	6.8	ND	ND
Trans-1,2-Dichloroethene	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND
Cis-1,3-Dichloropropene	ND	ND	ND	ND	ND
Trans-1,3-Dichloropropene	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND

Table 8.7.2 2009 Groundwater Detection Monitoring Program Results of Analysis – Groundwater Samples, Valley Filled – VOC Constituents (ug/L) – OK – Pittsburgh

Constituent	Well Number, Sample Date				
	VFW-2	VFW-2-1	VFW-3	VFW-10	VFW-14
	10/19/09	10/19/09	10/20/09	10/20/09	10/19/09
Methyl acetate	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND
Methylcyclohexane	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND
Methyl tert-butyl ether	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	13	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ND	ND	0.84	ND	ND
Trichlorofluromethane	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ND	ND	ND	ND
Toulene	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND
Xylenes (total)	ND	ND	ND	ND	ND

ND = not detected

Exceeded Pennsylvania Primary Drinking Water MCL and EPA Region III Risk Based Table

Table 8.7.3 2009 Groundwater Detection Monitoring Program Results of Analysis – Groundwater Samples, Valley Filled – SVOC Constituents (ug/L) – OK – Pittsburgh							
	Well Number, Sample Date				**Well Number, Sample Date**		
	VFW-2	**VFW-2-1**	**VFW-14**		**VFW-2**	**VFW-2-1**	**VFW-14**
Constituent	**10/19/09**	**10/19/09**	**10/19/09**	**Constituent**	**10/19/09**	**10/19/09**	**10/19/09**
Acenaphthene	ND	ND	ND	2,4-Dinitrotoluene	ND	ND	ND
Acenaphthylene	ND	ND	ND	2,6-Dinitrotoluene	ND	ND	ND
Acetophenone	ND	ND	ND	Di-n-octyl phthalate	ND	ND	ND
Anthracene	ND	ND	ND	Fluoranthene	ND	ND	ND
Atrazine	ND	ND	ND	Fluorene	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	Hexachlorobenzene	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	Hexachlorobutadiene	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	Hexachlorocyclopentadiene	ND	ND	ND
Benzo(ghi)perylene	ND	ND	ND	Hexachloroethane	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	Indeno(1,2,3-cd)pyrene	ND	ND	ND
Benzaldehyde	ND	ND	ND	Isophorone	ND	ND	ND
1,1-Biphenyl	ND	ND	ND	2-Methylnaphthalene	ND	ND	ND
Bis(2-chloroethoxyl) methane	ND	ND	ND	2-Methylphenol (o-Cresol)	ND	ND	ND
Bis (2-chloroethyl) ether	ND	ND	ND	4-Methylphenol (p-Cresol)	ND	ND	ND
Bis(2-ethylhexyl) phthalate	ND	ND	ND	Naphthalene	ND	ND	ND
4-Bromophenyl phenyl ether	ND	ND	ND	2-Nitroaniline	ND	ND	ND
Butyl benzyl phthalate	ND	ND	ND	3-Nitroaniline	ND	ND	ND
Caprolactam	ND	ND	ND	4-Nitroaniline	ND	ND	ND
Carbazole	ND	ND	ND	Nitrobenzene	ND	ND	ND
4-Chloroaniline	ND	ND	ND	2-Nitrophenol	ND	ND	ND
4-Chloro-3-methylphenol	ND	ND	ND	4-Nitrophenol	ND	ND	ND
2-Chloronaphthalene	ND	ND	ND	N-Nitrosodi-n-propylamine	ND	ND	ND
2-Chlorophenol	ND	ND	ND	N-Nitrosodiphenylamine	ND	ND	ND
4-Chlorophenyl phenyl ether	ND	ND	ND	2,2-Oxybis (1-Chloropropane)	ND	ND	ND
Chrysene	ND	ND	ND	Pentachlorophenol	ND	ND	ND
Dibenz(a,h)anthracene	ND	ND	ND	Phenanthrene	ND	ND	ND
Dibenzofuran	ND	ND	ND	Phenol	ND	ND	ND
3,3'-Dichlorobenzidine	ND	ND	ND	Pyrene	ND	ND	ND
2,4-Dichlorophenol	ND	ND	ND	2,4,5-Trichlorophenol	ND	ND	ND
Diethyl phthalate	ND	ND	ND	2,4,6-Trichlorophenol	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	1,3-Dichlorobenzene	ND	ND	ND
Dimethyl phthalate	ND	ND	ND	1,4-Dichlorobenzene	ND	ND	ND
Di-n-butyl phthalate	ND	ND	ND	1,2-Dichlorobenzene	ND	ND	ND
4,6-Dinitro-2-methlyphenol	ND	ND	ND	1,2,4-Trichlorobenzene	ND	ND	ND
2,4-Dinitrophenol	ND	ND	ND				

ND = not detected

Table 8.7.4 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples,
Valley Fill - TPH Constituents (mg/L) – Pittsburgh

Constituent	Well Number, Sample Date								
	VFW-2		VFW-2-1	VFW-4		VFW-7		VFW-9	
	05/07/09	10/19/09	10/19/09	05/08/09	10/19/09	05/07/09	10/19/09	05/07/09	10/20/09
TPH-DRO	ND	0.048	0.041	ND	ND	ND	0.047	0.048	ND

Constituent	Well Number, Sample Date									
	VFW-10		VFW-11		VFW-12		VFW-12-1	VFW-14		VFW-14-1
	05/07/09	10/20/09	05/07/09	10/20/09	05/07/09	10/20/09	05/07/09	05/08/09	10/19/09	05/08/09
TPH-DRO	ND	ND	ND	ND	0.074	ND	ND	ND	0.066	ND

ND = not detected; TPH = total petroleum hydrocarbons; TPH-DRO = total petroleum hydrocarbons - diesel range organics

Table 8.7.5 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples, Main Plateau – Groundwater Characteristics Constituents – Pittsburgh

Constituent	Well Number, Sample Date							
	MPW-2	MPW-4	MPW-4D	MPW-8	MPW-4-1	MPW-9	MPW-10	MPW-11
	10/21/09	10/21/09	10/21/09	10/21/09	10/21/09	10/21/09	10/21/09	10/20/09
Inorganics (ug/l)								
Aluminum	133	100	ND	132	78	18.5	ND	30.4
Boron	34.1	59.3	192	27.6	53.8	110	130	53.5
Calcium	759,000	308,000	4,960	732,000	278,000	25,400	1,900	221,000
Iron	339	59.1	52.8	ND	61.4	71.2	ND	ND
Magnesium	165,000	120,000	956	116,000	110,000	7,110	332	53,600
Manganese	2,900	198	26.2	181	137	54.7	3.3	235
Nickel	532	157	35.1	651	143	422	ND	154
Potassium	4,670	11,100	751	6,400	11,400	985	446	4,000
Silica	7,660	7,810	7,370	6,470	7,400	6,440	7,370	5,280
Sodium	496,000	209,000	252,000	761,000	193,000	184,000	210,000	237,000
Strontium	1,620	1,230	189	1,400	1,120	1,120	95.3	545
Quality Parameters (mg/L)								
Chloride	2,470	885	154	2,810	782	140	97.9	793
Fluoride	ND	ND	0.99	0.046	0.056	0.15	0.29	0.11
Nitrate	ND	0.30	0.11	ND	0.32	0.24	ND	0.39
Sulfate	135	87.5	14.9	176	75.5	11.1	7.0	116
Total Dissolved Solids	5,350	2,480	654	3,070	2,160	564	513	1,860
Total Alkalinity (Bicarbonate)	147	150	320	150	151	266	272	120
Total Alkalinity (Carbonate)	ND	ND	ND	ND	ND	ND	24.4	ND

ND = not detected

	Exceeded Pennsylvania Secondary Drinking Water
	Exceeded Pennsylvania Secondary Drinking Water Maximum Contaminant Level and Act 2 Secondary Maximum Contaminant Level
	Exceeded EPA Region III Risk Based Table, Pennsylvania Secondary Drinking Water MCL and Act 2 Secondary Maximum Contaminant Level

Table 8.7.6 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples, Valley Filled – Groundwater Characteristics Constituents – Pittsburgh

Constituent	Well Number, Sample Date												
	VFW-1	VFW-2	VFW-2-1	VFW-3	VFW-4	VFW-5	VFW-6	VFW-7	VFW-9	VFW-10	VFW-11	VFW-12	VFW-14
	10/21/09	10/19/09	10/19/09	10/20/09	10/19/09	10/19/09	10/19/09	10/19/09	10/20/09	10/20/09	10/20/09	10/20/09	10/19/09
Inorganics (ug/l)													
Aluminum	ND	36.5	39.9	29.0	31.2	41	33.5	41.2	25.4	31.7	26.3	37.4	76.7
Boron	240	174	174	60.8	60.4	118	198	55.3	21.2	104	39.5	271	182
Calcium	4,470	318,000	316,000	282,000	302,000	370,000	307,000	388,000	117,000	344,000	201,000	337,000	717,000
Iron	94.5	2,530	2,500	53.6	170	25	635	2,690	1,750	ND	14.1	ND	12,400
Magnesium	1420	65000	65100	112000	89800	57300	51800	82300	21700	57300	47000	88800	149000
Manganese	9	1,510	1,510	43.3	295	39	348	1,300	315	2,550	240	345	12,500
Nickel	ND	ND	ND	67.7	225	10.8	1.6	ND	585	14.4	112	373	2.5
Potassium	1,010	4,550	4,730	7,680	3,680	4,360	16,000	5,310	2,430	29,400	2,120	5,420	7,700
Silica	9,260	18,400	18,400	9,160	11,500	12,200	9,370	9,670	4,670	12,700	7,840	10,200	12,800
Sodium	230,000	296,000	294,000	251,000	35,000	332,000	743,000	447,000	71,700	782,000	63,100	327,000	990,000
Strontium	427	3,150	3,150	1,280	2,500	1,010	1,260	4,100	236	934	414	2,340	2,290
Quality Parameters (mg/L)													
Chloride	7.7	484	496	497	606	1,130	1,730	1,600	272	1,820	308	1,030	3,340
Fluoride	0.89	1.1	1.1	0.15	0.23	0.44	0.85	0.062	0.097	0.61	0.075	0.5	0.46
Nitrate	ND	ND	ND	1.2	0.019	0.37	ND	ND	2	0.29	0.17	0.84	ND
Sulfate	0.29	850	875	153	84.8	248	431	142	92.7	438	189	311	304
Total Dissolved Solids	566	2,280	2,280	2,320	2,000	3,040	4,000	3,700	736	3,790	1,140	2,530	6,860
Total Alkalinity Bicarbonate	502	235	235	287	283	265	84.3	201	73.5	225	213	319	211
Total Alkalinity Carbonate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detected

	Exceeded Pennsylvania Secondary Drinking Water MCL
	Exceeded Pennsylvania Secondary Drinking Water MCL and Act 2 Secondary Maximum Contaminant Level
	Exceeded Pennsylvania Secondary Drinking Water MCL, Act 2 Secondary Maximum Contaminant Level, and EPA Region III Risk Based Table

Table 8.7.7 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples, Main Plateau – Contamination Indicator Constituents – Pittsburgh

Constituent	Well Number, Sample Date						
	MPW-2	MPW-4	MPW-4D	MPW-8	MPW-9	MPW-10	MPW-11
	10/21/09	10/21/09	10/21/09	10/21/09	10/21/09	10/21/09	10/20/09
pH (standard units)	6.48	7.35	8.28	7.00	8.01	9.07	7.27
Specific Conductance (uS)	6900	3960	1122	7840	1001	929	3800
Temperature (^{0}C)	13.6	15.9	14.9	18.8	15.8	15.1	17.3
TOX (ug/l)	45.2	62.4	ND	684	58.1	ND	168
TOC (mg/L)	2.5	1.1	0.92	0.72	0.58	0.60	2.1

ND = not detected; TOX = total organic halogens; TOC = total organic carbon; specific conductance unit = umhos/cm @ 25 ℃;

	Exceeded Pennsylvania Secondary Drinking Water MCL

Table 8.7.8 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples, Valley Fill – Contamination Indicator Constituents – Pittsburgh

Constituent	Well Number, Sample Date											
	VFW-1		VFW-2		VFW-2-1	VFW-3		VFW-4		VFW-5		VFW-6	
	NS	10/21/09	05/07/09	10/19/09	10/19/09	NS	10/20/09	05/08/09	10/19/09	NS	10/19/09	NS	10/19/09
pH (standard units)	NS	8.27	7.11	7.25	7.25	NS	6.94	7	7.06	NS	7.08	NS	7.74
Specific Conductance (uS)	NS	896	4,133	2,928	2,928	NS	3,480	2,662	2,627	NS	4,112	NS	5,907
Temperature (^{0}C)	NS	14.3	12.4	15.2	15.2	NS	16.2	14.6	16	NS	12.9	NS	16.3
TOX (ug/l)	NS	ND	NS	28.7	ND	NS	52.7	NS	60.2	NS	321	NS	ND
TOC (mg/L)	NS	1	NS	1.5	1.6	NS	1.3	NS	0.63	NS	1.6	NS	2.4
	VFW-7		VFW-9			VFW-10		VFW-11		VFW-12		VFW-14	
	05/07/09	10/19/09	05/07/09	10/20/09		05/07/09	10/20/09	05/07/09	10/20/09	05/07/09	10/20/09	05/08/09	10/19/09
pH (standard units)	7.07	7.14	7.11	6.79		7.19	7.17	7.39	7.34	7.26	7.13	6.97	6.74
Specific Conductance (uS)	3,693	4,824	1,392	541		2,742	4,750	1,434	1,427	2,622	3,140	3,352	9,036
Temperature (^{0}C)	13.3	13.8	9.2	12.2		13.7	15.8	11.9	13.1	10.9	14.2	11.6	13.8
TOX (ug/l)	NS	1,370	NS	39.5		NS	123	NS	ND	NS	58.6	NS	164
TOC (mg/L)	NS	1.4	NS	1.6		NS	1.2	NS	0.85	NS	3.5	NS	2.1

ND = not detected; NS = not sampled; TOX = total organic halogens; TOC = total organic carbon; specific conductance unit = umhos/cm @ 25 ℃;

Table 10.4.1 Albany X-Ray Radiation Generating Devices

Device	Quantity	Location
X-Ray Florescence Instrument	1	B-1, Room 101
X-Ray Diffraction Instrument	1	B-1, Room 115
Scanning Electron Microscope	2	B-1, Rooms 109 & 119
Transmission Electron Microscope	1	B-1, Room 102
Sedigraph	1	B-17, Room 110

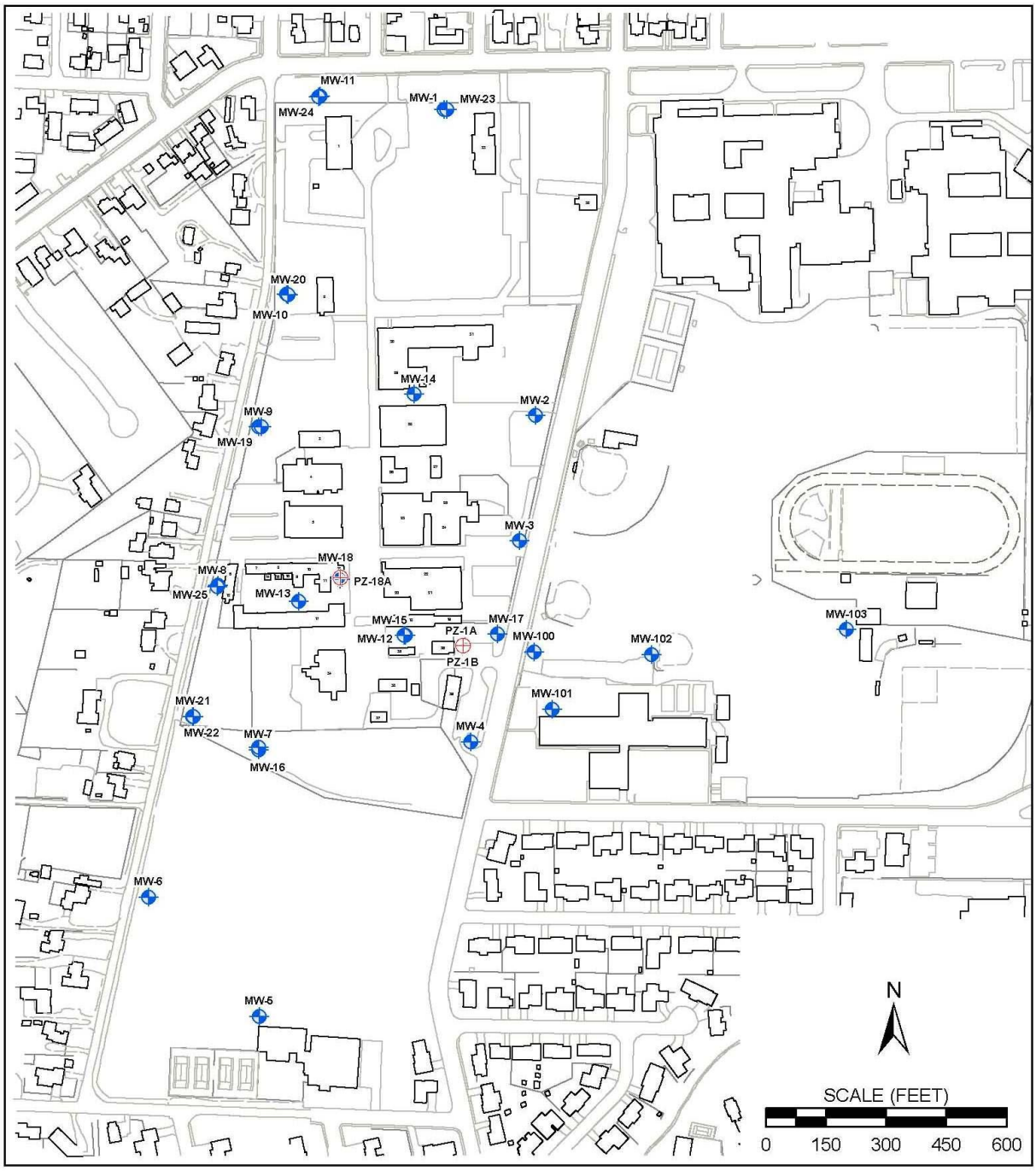


Figure 10.8.1 Monitoring Well Locations – Albany

Table 10.8.1 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – VOC Constituents (ug/L) – OK – Albany

	Well Number, Sample Date															
	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6		MW-7		MW-8	
Constituents	**3/17/09**	**9/2/09**	**3/18/09**	**9/2/09**	**3/18/09**	**9/2/09**	**3/17/09**	**9/1/09**	**3/19/09**	**8/31/09**	**3/16/09**	**9/1/09**	**3/18/09**	**9/2/09**	**3/18/09**	**9/2/09**
1,1,1,2-Tetrachloroethane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroehtane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-iso-Propyltoluene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	NS	**0.52**	**0.93**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detected; NS = not sampled

Exceeded ODEQ Standards

Table 10.8.2 2009 Groundwater Detection Monitoring Program
Results of Analysis-Groundwater Samples – VOC Constituents (ug/L) – OK – Albany

Constituents	Well Number, Sample Date															
	MW-9		MW-10		MW-11		MW-12		MW-13		MW-14		MW-15		MW-16	
	3/18/09	9/2/09	3/18/09	9/1/09	3/17/09	9/1/09	3/19/09	9/1/09	3/19/09	9/2/09	3/19/09	9/2/09	3/19/09	9/2/09	3/18/09	9/2/09
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroehtane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	0.22J	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-iso-Propyltoluene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	0.18J	0.14J	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	0.090J	0.44J	ND	ND	ND	ND

ND = not detected; NS = not sampled

Exceeded ODEQ Standards

Table 10.8.3 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – VOC Constituents (ug/L) – OK – Albany

Constituents	Well Number, Sample Date															
	MW-9		MW-10		MW-11		MW-12		MW-13		MW-14		MW-15		MW-16	
	3/18/09	9/2/09	3/18/09	9/2/09	3/17/09	9/1/09	3/19/09	9/1/09	3/19/09	9/2/09	3/19/09	9/2/09	3/19/09	9/2/09	3/18/09	9/2/09
Bromoform	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.84	ND	ND	ND	ND	ND	150	NS	0.2J	ND	3	ND	52	29	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	0.11J	17	NS	ND	ND	2.1	7.6	14	13	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	0.080J	NS	ND	ND	0.080J	ND	0.73J	0.72J	0.060J	ND
Cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	1.0J	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	2.3	ND	ND	ND	ND	ND
n-Butybenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	0.080J	NS	ND	ND	ND	ND	0.33J	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	0.55	ND	0.42J	0.88	ND	ND	0.4J	NS	1.4	ND	0.31	ND	640	890	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes,Total	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detected NS=not sampled

Exceeded ODEQ Standards

Table 10.8.4 NETL-ALBANY 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – VOC Constituents (ug/L) – OK

Constituents	Well Number, Sample Date															
	MW-17		MW-18		MW-19		MW-20		MW-21		MW-22		MW-23		MW-24	
	3/16/09	9/1/09	3/19/09	9/2/09	3/18/09	9/2/09	3/18/09	9/1/09	3/17/09	9/1/09	3/17/09	9/1/09	3/17/09	9/1/09	3/17/09	9/1/09
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroehtane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	0.14J	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	0.14J	0.14J	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
4-iso-Propyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	0.090J	0.08J	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND

ND = not detected, NS=not sampled

Table 10.8.5 NETL-ALBANY 2009 Groundwater Detection Monitoring Program
Results of Analysis-Groundwater Samples – VOC Constituents (ug/L) – OK

Constituents	Well Number, Sample Date															
	MW-17		MW-18		MW-19		MW-20		MW-21		MW-22		MW-23		MW-24	
	3/16/09	9/1/09	3/19/09	9/2/09	3/18/09	9/2/09	3/18/09	9/1/09	3/17/09	9/1/09	3/17/09	9/1/09	3/17/09	9/1/09	3/17/09	9/1/09
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	6.4	11	12,000	4,900	0.57	ND	680	880	6.9	NS	250J	300	4.6	4.2	14	13
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Chloroform	1.6	2.2	1,000	420	ND	ND	84	110	0.64	NS	33	34	1.4	1.1	3.6	3.6
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	1.4	2.6	11J	2.3J	ND	ND	0.23J	0.18	0.11J	NS	1.9	1.9	0.080J	ND	0.10J	0.11J
Cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	12J	ND	ND	ND	ND	ND	ND	NS	0.24J	0.33J	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
n-Butybenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	170	83	ND	ND	1.6	2.1	ND	NS	1.8	2.3	ND	ND	0.080J	0.12J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	0.29J	ND	ND	ND	ND	ND
Trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Trichloroethene	350	540	550	320D	0.52	ND	250	200	0.35J	NS	24	25	10	0.55	22	24
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Xylenes,Total	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND

ND = not detected, NS=not sampled

Exceeded ODEQ Standards

Table 10.8.6 NETL-ALBANY 2009 Groundwater Detection Monitoring Program Results of Analysis-Groundwater Samples – VOC Constituents (ug/L) – OK										
	Well Number, Sample Date									
	MW-25		MW-100		MW-101		MW-102		MW-103	
Constituents	3/18/09	9/2/09	3/18/09	9/1/09	3/16/09	9/1/09	3/16/09	8/31/09	3/16/09	9/1/09
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroehtane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-iso-Propyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 10.8.6 NETL-ALBANY 2009 Groundwater Detection Monitoring Program
Results of Analysis-Groundwater Samples – VOC Constituents (ug/L) – OK

Constituents	Well Number, Sample Date									
	MW-25		MW-100		MW-101		MW-102		MW-103	
	3/18/09	9/2/09	3/18/09	9/1/09	3/16/09	9/1/09	3/16/09	8/31/09	3/16/09	9/1/09
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detected

Table 10.8.7 NETL-ALBANY 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – VOC Constituents (ug/L) – OK

Constituents	Well Number, Sample Date									
	MW-25		MW-100		MW-101		MW-102		MW-103	
	3/18/09	9/2/09	3/18/09	9/1/09	3/16/09	9/1/09	3/16/09	8/31/09	3/16/09	9/1/09
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	5.6	13	ND	ND	2.7	1.9	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	1.3	2.6	ND	ND	1.8	1.6	0.07J	0.07J
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	ND	ND	0.29J	0.48J	0.1J	0.12J	1.2	1.6	ND	0.08J
Cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butybenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 10.8.7 NETL-ALBANY 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – VOC Constituents (ug/L) – OK

Constituents	Well Number, Sample Date									
	MW-25		MW-100		MW-101		MW-102		MW-103	
	3/18/09	9/2/09	3/18/09	9/1/09	3/16/09	9/1/09	3/16/09	8/31/09	3/16/09	9/1/09
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	0.12J	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	0.09J	ND	ND	ND
Trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	380	700	0.3J	ND	180	130	1	1.6
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes,Total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detected

Exceeded ODEQ Standards

Table 10.8.8 NETL-ALBANY 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – Groundwater Characteristics Constituents

Constituents	Well Number, Sample Date									
	MW-1		MW-2		MW-3		MW-4		MW-5	
	3/17/09	9/1/09	3/18/09	9/1/09	3/18/09	9/1/09	3/17/09	8/31/09	3/19/09	9/1/09
Inorganics (mg/L)										
Aluminum	NS	NS	NS	NS	0.465	NS	0.0065	NS	NS	NS
Antimony	NS	NS	NS	NS	ND	NS	ND	NS	NS	NS
Arsenic	NS	NS	NS	NS	0.0004	NS	0.0005	NS	NS	NS
Barium	NS	NS	NS	NS	0.00938	NS	0.0384	NS	NS	NS
Beryllium	NS	NS	NS	NS	0.000025	NS	ND	NS	NS	NS
Cadmium	NS	NS	NS	NS	ND	NS	ND	NS	NS	NS
Calcium	NS	NS	NS	NS	20.7	NS	36.8	NS	NS	NS
Chromium	NS	NS	NS	NS	0.00116	NS	0.00045	NS	NS	NS
Cobalt	NS	NS	NS	NS	0.000958	NS	0.000113	NS	NS	NS
Copper	NS	NS	NS	NS	0.00092	NS	0.00026	NS	NS	NS
Iron	NS	NS	NS	NS	1.35	NS	0.0948	NS	NS	NS
Lead	NS	NS	NS	NS	0.000243	NS	ND	NS	NS	NS
Magnesium	NS	NS	NS	NS	10.9	NS	18.9	NS	NS	NS
Manganese	NS	NS	NS	NS	0.0334	NS	0.00481	NS	NS	NS
Mercury	NS	NS	NS	NS	ND	NS	ND	NS	NS	NS
Nickel	NS	NS	NS	NS	0.0014	NS	0.00082	NS	NS	NS
Potassium	NS	NS	NS	NS	0.621	NS	1.13	NS	NS	NS
Selenium	NS	NS	NS	NS	ND	NS	ND	NS	NS	NS
Silver	NS	NS	NS	NS	ND	NS	ND	NS	NS	NS
Sodium	NS	NS	NS	NS	8.83	NS	19.8	NS	NS	NS
Thallium	NS	NS	NS	NS	0.000005	NS	0.000002	NS	NS	NS
Vanadium	NS	NS	NS	NS	0.00642	NS	0.00359	NS	NS	NS
Zinc	NS	NS	NS	NS	0.0016	NS	0.0014	NS	NS	NS
Quality Parameters										
Chloride (mg/L)	8.4J	NS	2.6J	NS	3.1J	NS	17J	NS	22.7J	NS
Radium-226 (pCI/L)	NS	NS	NS	NS	ND	NS	ND	NS	NS	NS
Radium-228 (pCI/L)	NS	NS	NS	NS	ND	NS	ND	NS	NS	NS

ND =not detected; NS = not sampled

Exceeded ODEQ Standards

Table 10.8.9 NETL-ALBANY 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – Groundwater Characteristics Constituents

Constituents	Well Number, Sample Date									
	MW-6		MW-7		MW-8		MW-9		MW-10	
	3/16/09	9/1/09	3/18/09	9/1/09	3/18/09	9/1/09	3/18/09	8/31/09	3/18/09	9/1/09
Inorganics (mg/L)										
Aluminum	0.187	NS	NS	NS	NS	NS	NS	NS	NS	NS
Antimony	0.000046	NS	NS	NS	NS	NS	NS	NS	NS	NS
Arsenic	0.007	NS	NS	NS	NS	NS	NS	NS	NS	NS
Barium	0.0119	NS	NS	NS	NS	NS	NS	NS	NS	NS
Beryllium	0.000010J	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cadmium	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS
Calcium	11.9	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	0.00183	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cobalt	0.000379	NS	NS	NS	NS	NS	NS	NS	NS	NS
Copper	0.00065	NS	NS	NS	NS	NS	NS	NS	NS	NS
Iron	0.946	NS	NS	NS	NS	NS	NS	NS	NS	NS
Lead	0.000127	NS	NS	NS	NS	NS	NS	NS	NS	NS
Magnesium	6.66	NS	NS	NS	NS	NS	NS	NS	NS	NS
Manganese	0.0726	NS	NS	NS	NS	NS	NS	NS	NS	NS
Mercury	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nickel	0.00084	NS	NS	NS	NS	NS	NS	NS	NS	NS
Potassium	0.439	NS	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS
Silver	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS
Sodium	7.67	NS	NS	NS	NS	NS	NS	NS	NS	NS
Thallium	0.000003	NS	NS	NS	NS	NS	NS	NS	NS	NS
Vanadium	0.00496	NS	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	0.0022	NS	NS	NS	NS	NS	NS	NS	NS	NS
Quality Parameters										
Chloride (mg/L)	2.5J	NS	3.2J	NS	2.1J	NS	2J	NS	4.1J	NS
Radium-226 (pCI/L)	ND	NS	NS	NS	Ns	NS	NS	NS	NS	NS
Radium-228 (pCI/L)	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS

ND =not detected; NS = not sampled

Exceeded ODEQ Standards

Table 10.8.10 NETL-ALBANY 2009 Groundwater Detection Monitoring Program
Results of Analysis-Groundwater Samples-Groundwater Characteristics Constituents

Constituents	Well Number, Sample Date									
	MW-11		MW-12		MW-13		MW-14		MW-15	
	3/17/09	9/1/09	3/19/09	9/1/09	3/19/09	9/1/09	3/19/09	8/31/09	3/19/09	9/1/09
Inorganics (mg/L)										
Aluminum	NS	NS	NS	NS	0.0623	NS	0.879	NS	0.449	
Antimony	NS	NS	NS	NS	0.000043	NS	0.000047	NS	0.000088	NS
Arsenic	NS	NS	NS	NS	0.0012	NS	0.0006	NS	0.0005	NS
Barium	NS	NS	NS	NS	0.0141	NS	0.0111	NS	0.0397	NS
Beryllium	NS	NS	NS	NS	ND	NS	0.000037	NS	0.000016	NS
Cadmium	NS	NS	NS	NS	ND	NS	0.000034	NS	0.000032	NS
Calcium	NS	NS	NS	NS	16.2	NS	15.6	NS	348	NS
Chromium	NS	NS	NS	NS	0.00091	NS	0.00157	NS	0.00102	NS
Cobalt	NS	NS	NS	NS	0.000092	NS	0.00159	NS	0.00153	NS
Copper	NS	NS	NS	NS	0.00022	NS	0.00167	NS	0.00131	NS
Iron	NS	NS	NS	NS	0.107	NS	2.12	NS	0.684	NS
Lead	NS	NS	NS	NS	0.000084	NS	0.000300	NS	0.000182	NS
Magnesium	NS	NS	NS	NS	8.48	NS	7.6	NS	181	NS
Manganese	NS	NS	NS	NS	0.043	NS	0.064	NS	0.268	NS
Mercury	NS	NS	NS	NS	ND	NS	ND	NS	ND	NS
Nickel	NS	NS	NS	NS	0.00078	NS	0.00186	NS	0.00589	NS
Potassium	NS	NS	NS	NS	0.826	NS	0.858	NS	3.34	NS
Selenium	NS	NS	NS	NS	ND	NS	ND	NS	ND	NS
Silver	NS	NS	NS	NS	ND	NS	ND	NS	ND	NS
Sodium	NS	NS	NS	NS	6.9	NS	8.99	NS	62.4	NS
Thallium	NS	NS	NS	NS	ND	NS	0.000007	NS	0.000029	NS
Vanadium	NS	NS	NS	NS	0.00668	NS	0.0102	NS	0.00424	NS
Zinc	NS	NS	NS	NS	0.0013	NS	0.0037	NS	0.0046	NS
Quality Parameters										
Chloride (mg/L)	3.1J	NS	3.3J	NS	2.4J	NS	7.1J	NS	1260J	NS
Radium-226 (pCI/L)	NS	NS	NS	NS	ND	NS	ND	NS	ND	NS
Radium-228 (pCI/L)	NS	NS	NS	NS	ND	NS	ND	NS	ND	NS

ND =not detected; NS = not sampled

Exceeded ODEQ Standards

Table 10.8.11 NETL-ALBANY 2009 Groundwater Detection Monitoring Program
Results of Analysis– Groundwater Samples – Groundwater Characteristics Constituents

	Well Number, Sample Date									
	MW-16		MW-17		MW-18		MW-19		MW-20	
Constituents	3/18/09	9/1/09	3/16/09	9/1/09	3/19/09	9/1/09	3/18/09	8/31/09	3/18/09	9/1/09
Inorganics (mg/L)										
Aluminum	0.321	NS	0.126	NS	0.368	NS	0.0742	ND	0.235	NS
Antimony	ND	NS	0.000072	NS	0.000039	NS	ND	ND	0.000043	NS
Arsenic	0.0039	NS	0.001	NS	0.0011	NS	0.0004	ND	0.0014	NS
Barium	0.0233	NS	0.00624	NS	0.00793	NS	0.013	ND	0.0173	NS
Beryllium	0.000015J	NS	ND	NS	0.000015J	NS	ND	ND	0.000009J	NS
Cadmium	ND	NS	0.000036	NS	ND	NS	ND	ND	ND	NS
Calcium	36.9	NS	38.7	NS	24.7	NS	11.8	ND	33	NS
Chromium	0.00045	NS	0.00066	NS	0.00089	NS	ND	ND	0.00094	NS
Cobalt	0.000453	NS	0.000274	NS	0.000613	NS	0.000379	ND	0.000735	NS
Copper	0.00143	NS	0.00212	NS	0.00067	NS	0.00036	ND	0.00054	NS
Iron	4.63	NS	0.288	NS	0.823	NS	0.152	ND	0.507	NS
Lead	0.00026	NS	0.000073	NS	0.000272	NS	0.000158	ND	0.000151	NS
Magnesium	16.7	NS	19.6	NS	12	NS	6.03	ND	15.5	NS
Manganese	1.05	NS	0.0323	NS	0.035	NS	0.57	ND	0.457	NS
Mercury	ND	NS	ND	NS	ND	NS	ND	ND	ND	NS
Nickel	0.00093	NS	0.00081	NS	0.00099	NS	0.00054	ND	0.00112	NS
Potassium	1.39	NS	1.21	NS	0.812	NS	0.443	ND	0.949	NS
Selenium	ND	NS	ND	NS	ND	NS	ND	ND	ND	NS
Silver	ND	NS	ND	NS	ND	NS	ND	ND	ND	NS
Sodium	14.9	NS	20.3	NS	18.8	NS	7.26	ND	23.3	NS
Thallium	0.000003	NS	0.000005	NS	0.000005	NS	0.000005	ND	ND	NS
Vanadium	0.00142	NS	0.00699	NS	0.0107	NS	0.00158	ND	0.0102	NS
Zinc	0.0026	NS	0.0031	NS	0.0019	NS	0.0008	ND	0.0036	NS
Quality Parameters										
Chloride (mg/L)	3.9J	NS	24.7J	NS	21J	NS	2.2J	NS	64.6J	NS
Radium-226 (pCI/L)	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS
Radium-228 (pCI/L)	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS

ND = not detected; NS = not sampled

Exceeded ODEQ Standards

Table 10.8.12 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – Groundwater Characteristics Constituents – Albany

Constituents	Well Number, Sample Date									
	MW-21		MW-22		MW-23		MW-24		MW-25	
	3/17/09	9/1/09	3/17/09	9/1/09	3/17/09	9/1/09	3/19/09	8/31/09	3/18/09	9/1/09
Inorganics (mg/L)										
Aluminum	**0.579**	NS	**0.278**	NS	**0.284**	NS	**0.266**	NS	NS	NS
Antimony	ND	NS	0.000039	NS	0.000042	NS	0.000038	NS	NS	NS
Arsenic	**0.0129**	NS	**0.0013**	NS	**0.0011**	NS	**0.0011**	NS	NS	NS
Barium	0.0195	NS	0.00887	NS	0.00793	NS	0.00848	NS	NS	NS
Beryllium	0.000032	NS	0.000010J	NS	0.000011J	NS	0.000017	NS	NS	NS
Cadmium	0.000018	NS	ND	NS	ND	NS	ND	NS	NS	NS
Calcium	40.1	NS	22.2	NS	28.6	NS	21.4	NS	NS	NS
Chromium	0.0009	NS	0.0043	NS	0.00107	NS	0.00123	NS	NS	NS
Cobalt	0.000772	NS	0.000378	NS	0.001	NS	0.000609	NS	NS	NS
Copper	0.00354	NS	0.00079	NS	0.00074	NS	0.00051	NS	NS	NS
Iron	**3.93**	NS	**0.694**	NS	**0.862**	NS	**0.979**	NS	NS	NS
Lead	0.000358	NS	0.000116	NS	0.000158	NS	0.000197	NS	NS	NS
Magnesium	17.4	NS	10.1	NS	15.8	NS	12.8	NS	NS	NS
Manganese	**0.969**	NS	0.0471	NS	0.0335	NS	0.0258	NS	NS	NS
Mercury	ND	NS	ND	NS	ND	NS	ND	NS	NS	NS
Nickel	0.00163	NS	0.00093	NS	0.00111	NS	0.00077	NS	NS	NS
Potassium	1.21	NS	1	NS	1.05	NS	0.838	NS	NS	NS
Selenium	ND	NS	ND	NS	ND	NS	ND	NS	NS	NS
Silver	ND	NS	ND	NS	ND	NS	ND	NS	NS	NS
Sodium	15.7	NS	21.4	NS	14.9	NS	15.7	NS	NS	NS
Thallium	0.000005	NS	0.000004	NS	0.000003	NS	0.000004	NS	NS	NS
Vanadium	0.00511	NS	0.00739	NS	0.0104	NS	0.0109	NS	NS	NS
Zinc	0.0031	NS	0.0014	NS	0.0017	NS	0.0017	NS	NS	NS
Quality Parameters										
Chloride (mg/L)	12.2J	NS	10.8J	NS	8.2J	NS	16J	NS	2.3J	NS
Radium-226 (pCI/L)	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS
Radium-228 (pCI/L)	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS

ND = not detected; NS = not sampled

Exceeded ODEQ Standards

Table 10.8.13 2009 Groundwater Detection Monitoring Program Results of Analysis – Groundwater Samples – Groundwater Characteristics Constituents – Albany								
	Well Number, Sample Date							
	MW-100		MW-101		MW-102		MW-103	
Constituents	**3/18/09**	**9/1/09**	**3/16/09**	**9/1/09**	**3/16/09**	**9/1/09**	**3/16/09**	**8/31/09**
Inorganics (mg/L)								
Aluminum	NS	NS	NS	NS	NS	NS	NS	NS
Antimony	NS	NS	NS	NS	NS	NS	NS	NS
Arsenic	NS	NS	NS	NS	NS	NS	NS	NS
Barium	NS	NS	NS	NS	NS	NS	NS	NS
Beryllium	NS	NS	NS	NS	NS	NS	NS	NS
Cadmium	NS	NS	NS	NS	NS	NS	NS	NS
Calcium	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	NS	NS	NS	NS	NS	NS	NS	NS
Cobalt	NS	NS	NS	NS	NS	NS	NS	NS
Copper	NS	NS	NS	NS	NS	NS	NS	NS
Iron	NS	NS	NS	NS	NS	NS	NS	NS
Lead	NS	NS	NS	NS	NS	NS	NS	NS
Magnesium	NS	NS	NS	NS	NS	NS	NS	NS
Manganese	NS	NS	NS	NS	NS	NS	NS	NS
Mercury	NS	NS	NS	NS	NS	NS	NS	NS
Nickel	NS	NS	NS	NS	NS	NS	NS	NS
Potassium	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	NS	NS	NS	NS	NS	NS	NS	NS
Silver	NS	NS	NS	NS	NS	NS	NS	NS
Sodium	NS	NS	NS	NS	NS	NS	NS	NS
Thallium	NS	NS	NS	NS	NS	NS	NS	NS
Vanadium	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	NS	NS	NS	NS	NS	NS	NS	NS
Quality Parameters								
Chloride (mg/L)	18J	NS	78.4J	NS	130J	NS	7.3J	NS
Radium-226 (pCI/L)	ND	NS	ND	NS	ND	NS	ND	NS
Radium-228 (pCI/L)	ND	NS	ND	NS	ND	NS	ND	NS

ND = not detected; NS = not sampled

Table 10.8.14 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – Groundwater Characteristics Constituents – Albany

	Well Number, Sample Date									
	MW-1		MW-2		MW-3		MW-4		MW-5	
Constituents	3/17/09	9/1/09	3/18/09	9/2/09	3/18/09	9/2/09	3/17/09	9/1/09	3/19/09	8/31/09
pH (standard units)	7.32	NS	6.06	6.75	6.68	6.71	6.79	6.7	6.89	6.87
Specific Conductance (uS/cm)	374	NS	109	128	206	273	487	437	298	318
Turbidity (NTU)	7.13	NS	24.6	9.95	9.27	11	0.57	6.8	2.37	13.7
Dissolved Oxygen (mg/L)	1.4	NS	3.15	7.09	6.36	6.28	1.36	0.89	10.22	6.42
Temperature (°C)	13.65	NS	15	15.55	14.9	18.01	11.90	19.05	13.05	14.02
Eh (mV)	165.5	NS	127.5	277.7	181.1	119.2	105.2	72.9	-23.9	20.4
	Well Number, Sample Date									
	MW-6		MW-7		MW-8		MW-9		MW-10	
Constituents	3/16/09	9/1/09	3/18/09	9/2/09	3/18/09	9/2/09	3/18/09	9/2/09	3/18/09	9/2/09
pH (standard units)	6.83	6.56	6.35	6.37	6.43	6.53	6.11	7.12	6.61	6.93
Specific Conductance (uS/cm)	152	179	305	339	134	180	91	253	218	303
Turbidity (NTU)	9.11	5.6	4.63	3.49	3.4	0.58	1.43	2.9	146	750
Dissolved Oxygen (mg/L)	10.96	4.54	2.90	2.37	0.68	0.62	1.58	2.41	5.83	1.5
Temperature (°C)	12.55	14.87	11.51	14.38	12.8	14.24	10.55	13.48	11.99	15.3
Eh (mV)	150.5	207.7	185.3	167.4	169.9	161.3	210.5	204.9	202.2	108

Specific conductance unit = umhos/cm @ 25 EC

Table 10.8.15 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – Groundwater Characteristics Constituents – Albany

	Well Number, Sample Date									
	MW-11		MW-12		MW-13		MW-14		MW-15	
Constituents	3/17/09	9/1/09	3/19/09	9/2/09	3/19/09	9/2/09	3/19/09	9/2/09	3/19/09	9/2/09
pH (standard units)	5.85	6	6.86	NS	6.7	6.65	6.81	6.57	6.78	6.41
Specific Conductance (uS/cm)	107	176	259	NS	225	193	181	192	4655	3451
Turbidity (NTU)	2.87	67	9.29	NS	3.2	6.38	9.74	10.42	8.78	8.2
Dissolved Oxygen (mg/L)	5.22	5.66	12.16	NS	8.37	2.98	5.8	4.09	1.69	0.9
Temperature (°C)	12.38	16.32	13.62	NS	13.44	19.83	15.48	18.08	13.67	16.39
Eh (mV)	197.7	383.6	190.3	NS	181.2	385.6	175	426.2	187.9	135.3
	Well Number, Sample Date									
	MW-16		MW-17		MW-18		MW-19		MW-20	
Constituents	3/18/09	9/2/09	3/17/09	9/1/09	3/19/09	9/2/09	3/18/09	9/2/09	3/18/09	9/1/09
pH (standard units)	6.72	6.66	7.25	7.25	7.08	7.04	6.53	6.43	7.15	7.05
Specific Conductance (uS/cm)	340	403	519	487	298	346	144	157	431	406
Turbidity (NTU)	9.74	11	6.35	2.9	9.75	6.37	3.35	10.17	8.14	1.9
Dissolved Oxygen (mg/L)	1.21	0.31	4.1	1.8	11.75	0.64	1.09	0.4	2.78	0.99
Temperature (°C)	12.7	14.92	13.58	15.64	15.8	17.27	12.36	13.18	14.27	15.97
Eh (mV)	-43.4	-79.7	129.4	76.1	146.5	397.6	139.7	175.6	174.7	102.8

Specific conductance unit = umhos/cm @ 25 EC; NS = not sampled

Table 10.8.16 2009 Groundwater Detection Monitoring Program
Results of Analysis – Groundwater Samples – Groundwater Characteristics Constituents – Albany

	Well Number, Sample Date									
	MW-21		MW-22		MW-23		MW-24		MW-25	
Constituents	3/17/09	9/1/09	3/17/09	9/1/09	3/17/09	9/1/09	3/17/09	9/1/09	3/18/09	9/2/09
pH (standard units)	7.27	NS	7.16	7.03	7.51	7.24	7.31	7.21	6.71	6.78
Specific Conductance (uS/cm)	369	NS	259	283	385	330	269	303	163	199
Turbidity (NTU)	18	NS	9.62	4.48	9.5	7.17	9.08	9.96	2.16	5.24
Dissolved Oxygen (mg/L)	0.23	NS	0.61	4.62	1.86	6.9	2.03	2.12	0.76	1.35
Temperature (°C)	12.41	NS	12.35	13.69	13.62	15.75	13.35	15.57	13.23	14.38
Eh (mV)	-105.6	NS	75.6	284.3	178.3	441.6	98.9	410.1	162.9	149.4

	Well Number, Sample Date							
	MW-100		MW-101		MW-102		MW-103	
Constituents	3/18/09	9/1/09	3/16/09	9/1/09	3/16/09	9/1/09	3/16/09	9/1/09
pH (standard units)	7.07	6.92	7.28	7.2	7.25	6.78	7.26	7.04
Specific Conductance (uS/cm)	445	526	773	667	805	1003	228	235
Turbidity (NTU)	50.5	28	84.5	26	40.30	42.2	9.44	9.12
Dissolved Oxygen (mg/L)	2.28	0.76	0.45	0.36	1.	0.54	5.02	5.03
Temperature (°C)	14.76	16.81	15.03	16.97	13.11	15.91	13.37	14.78
Eh (mV)	182.6	70.6	-38.2	-44.8	51.4	168.6	194.2	337.5

Specific conductance unit = umhos/cm @ 25 EC